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[OFFICIAL NOTICE.]

Thirty-Eighth Annual Meeting, New England Association of Gas Engineers.

NEW ENGLAND ASSOCIATION OF GAS ENGINEERS,
OFFICE OF SECRETARY,
EAST BOSTON, MASS., Jan. 29, 1908.

To the Members of the New England Association of Gas Engineers: The Thirty-eighth Annual Meeting of the New England Association of Gas Engineers will be held in Young's Hotel, Boston, Wednesday and Thursday, February 19 and 20, 1908.

Members having suggestions or questions which they wish discussed will please forward them at once to the Secretary. Also, applications for membership should be sent in to the Secretary as soon as possible.

N. W. GIFFORD, Secretary.

BRIEFLY TOLD.

DEATH OF DR. A. W. WILKINSON.—With exceeding regret we report the death of Dr. Asa Williams Wilkinson, who passed away after a brief illness, in his apartments in the Hoffman House, this city, the afternoon of Saturday, the 25th ult. Dr. Wilkinson was perhaps one of the best known chemists of the United States for a period covering 40 years or more, having acquired his tuition in Brown University and he New York Medical College. In 1860 he acted as assistant to Prof. R. Ogden Doremus, then a lecturer in the New York Medical College, and when in 1860 Bellevue Medical College was established he continued with Prof. Doremus who had been appointed Professor of Chemistry and Toxicology to that institution. Later on (we believe it was by the New York College) the Degree of Doctor was conferred upon him. Shortly after the construction of the New York Mutual Gas Light Company (about 1870) Dr. Wilkinson became greatly interested in the chemistry of gases, through his connection with Messrs. Kennedy, Rowland and others, and he was subsequently retained by the Mutual Company as its chemist, which position he held up to his death. During his connection with the Company he patented two or more systems of making water gas, one of which (the Wilkinson process is the name by which it is familiarly called) is well known to gas makers throughout the world. He was also the inventor of several methods for rapid determining analysis account. He was a member of many societies, but the one to which he yielded the greatest allegiance was undoubtedly the Society of Gas Lighting, from the meetings of which he was seldom absent. He is survived by his wife. The funeral services were held in the Hoffman House, the morning of January 28th. This brief mention will be succeeded by a lengthier history of his useful life.

ANNUAL MEETING, CONSOLIDATED GAS COMPANY, NEW YORK.—The annual meeting of the Consolidated Gas Company, of New York, was held last week in its general offices, the proceedings being directed by Mr. William Nelson Cromwell. There was a large attendance, and the feature of the session was the unqualified indorsement given by the shareholders to the acts of the Trustees, as reported. The vacancy caused by the death of Mr. Samuel Sloan was filled by the naming of his son, Mr. Samuel Sloan. Mr. Moses Taylor Pine's resignation having been accepted, as was that of Mr. F. A. Schermerhorn, the Trustees named Mr. Moses Taylor and Mr. Walter R. Addicks, respectively, as successors. The re-election of Mr. James Stillman was hailed with acclaim, since it was feared that he had found the burden of the work too heavy. All of the fraternity will join in an expression of satisfaction over the promotion of Mr. Walter R. Addicks. If ever a business man fairly won his spurs that credit should go to him. The annual reports, which were, as usual, not in particularly set form, were succinct enough to show that the sums deposited with the U. S. Commissioners, on account of the 20 cents per 1,000 retention from consumers until the validity of the 80-cent rate law is finally determined, to December 31st last, was $6,387.340.50. There was also due from the city, on account of gas and electric lighting for public use, the sum of $6,184,341.26, making no mention of interest thereon. Some of these "deferred payments" go back several years. The reports naturally referred at length to Master Masten's decision, and the subsequent legal steps taken in connection therewith. We are sorry that we are unable to give any of the physical details of the Company's operations—the references to the grand construction work going on at Astoria were especially notable—either from the standpoint of output or of expenditure in construction. The particulars, however, are suggestively vast.

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SMITHSONIAN DEPOSIT

The Bureau of Information, American Gas Institute.

The officers of the American Gas Institute, having examined very carefully plans for enlarging the work of its Bureau of Information, have, through the Technical Committee, determined to appoint a Bureau of Information from among the members of the Institute and to publish in the AMERICAN GAS LIGHT JOURNAL the questions that are presented by the members. Replies to these questions are asked from our readers, and these replies will be published in the JOURNAL. That reply which receives the approval of the Bureau is to be republished, credit being given to the author. Should no reply, in the opinion of the Bureau, be so framed as to cover all the correct data on hand applicable to the question, an answer will be formulated which will be published in the JOURNAL. It is hoped by the Technical Committee that this publicity of the questions will result in widespread interest and a large number of replies to the questions, and yet secure a definite reply based on the knowledge of the subject in the possession of the Bureau of Information. The latter reserve the right to exclude from the JOURNAL any reply that in their opinion would give undue advantage to any manufacturer or mercantile concern, such as questions in which the inquirer asks where he can purchase certain supplies. The questions are numbered serially following upon those presented last year, the answers to which were recorded in the Proceedings of the Institute for 1907.

These matters are in the hands mainly of Mr. W. H. Gartley, Chairman of the Technical Committee, and, if we mistake not, he is virtually the Chief of the Bureau of Information. We hope that the juniors in the profession, especially, will take full advantage of this excellent opportunity to enlighten themselves on troublesome points; that they should do so certainly needs no expression from us, since here they have, for the mere asking, advice from those who are in the ranks of the leaders of their profession.

QUESTIONS SUBMITTED TO THE BUREAU OF INFORMATION.

These are the questions that are now ready for consideration:

QUESTION NO. VIII.—"Given a choice of 3 retort houses, one built with 22-foot, through retorts, the second with 15-foot through retorts, the third with 9-foot, stop-end retorts. The treatment of the gas beyond the standpipe is identical in the three works. The 22-foot through retorts are charged and pushed by the machinery best adapted for them, and the heating of these retorts is the best that can be secured in the present state of the art. These retorts have a standpipe at each end, which standpipes are kept clean by the stokers in the usual way, assuming the best retort house practice in this respect, but not assuming any special machinery for reaming pipes. As the tendency of one of the pipes of each retort to do less than its share of the work is well known, ordinary watchfulness, such as might be expected in any well organized gas plant, is to be assumed as guarding against this tendency, but no extraordinary precautions, the successful application of which have not been proven in practice.

"The 15 foot through retorts are assumed to be charged and pushed by the machinery best adapted to these retorts. The heating of these retorts is assumed to be the best that can be secured in the present state of the art. These retorts have only one standpipe. Both the 22-foot through retorts and the 15-foot retorts are charged as full of coal as the best practice would direct, there being no such limitation in this respect as with a retort where the coke cannot be pushed out. The stop-end retorts are also assumed to be charged by machinery and heated in the best possible manner. These retorts have one standpipe and they are charged as full as the process of withdrawing the coke with a machine rake will allow. Neglecting all personal factors, and assuming that each works is operated under conditions best suited to its equipment; assuming that the same coal is used in the three works, and that this coal is a good grade of gas coal, such as the well-known gas coals of the Pittsburgh field, and that the heats are carried in all three works so that the same yield of gas per pound of coal is secured in each, which may in turn be assumed at 5 cubic feet per pound, what difference of candle power and heat units may reasonably be expected in the finished product of the three works, because of their varying factor of retort lengths; and what are the reasons for this opinion?"

QUESTION NO. IX.—[Omitted on account of being of an advertising nature.]

QUESTION NO. X.—"Can the Bureau of Information inform me if there is any particular kind of anthracite broken coal particularly adapted for water gas manufacture? If so, from what region or vein is this coal mined?"

QUESTION NO. XI.—"What is the practice concerning the matter of insurance on gas plants of the latest fireproof design, and where no wood enters into the construction, and are there any companies carrying their own insurance or carrying no insurance at all?"

[Continued from page 138.]

PROCEEDINGS AMERICAN GAS INSTITUTE, SECOND ANNUAL MEETING, HELD AT THE NEW WILLARD HOTEL, WASHINGTON, D. C., OCTOBER 16, 17 AND 18, 1907.

THIRD DAY—MORNING SESSION.

The President—Next in order are the papers on "Air Blast Gas Appliances," by Messrs. W. H. Allen, W. K. Eavenson and S. Tully Wilson, respectively. The first will be read by Mr. W. K. Eavenson.

Mr. W. K. Eavenson, of Philadelphia, Pa., then read the following paper on

AIR BLAST GAS APPLIANCES.

Definition.—This paper deals exclusively with that type of appliance with which illuminating gas is used with air pressure. Air under positive pressure of from 1 to 2 pounds is indispensable in this system of combustion.

Makers.—A gas furnace company, of New York city, went into the subject of air blast gas appliances some 25 years ago. They first perfected a burner that could be used under pressure, then, finding out just the kind of work a consumer wanted to do, built a furnace or machine to that work. Undoubtedly it was not long before they were called upon to make a burner that could be kept lit in the open under pressure, and their brazing burners, soft metal burners, ribbon burners, the Machlet tip and a few others are the results.

Makers of air blast gas appliances whose names have come to my attention are: The American Gas Furnace Company; The Chicago Flexible Shaft Company; James H. Walker, Milwaukee, Wis.; Albany Foundry Company, and Leiman Brothers, New York city.

Guides to Purchasing.—In order to guide the purchaser, the Gas Furnace Company adopted the encircled figure method of cataloguing their products. The encircled figure, in connection with a blower, represents the air supplying capacity of that blower in terms of a unit of value, based upon the passing capacity, at 1 pound loss in pressure, of an orifice having an area equal to that of a square whose sides are ⅛ inch. In connection with an appliance, the encircled figure represents the air consumption of that particular appliance in terms of the same unit. For example, if the encircled figure of a blower is given as 33, and that of a furnace as 10, we know that the blower will supply 3 such furnaces, with a margin to spare.

Construction of Air Injector.—In the different types of burners described below, the gas and air are mixed by an injector as shown in Fig. 1. The air nozzle is soldered on the service ell *A* and extends in the tee *B*, slightly beyond the center line of the side outlet, carrying the air past the gas-way, the air creating a slight suction on the gas line. The air and gas are mixed in the pipe *C* on the way to the burner. The air nozzle is made of tin and can easily be replaced by another of different diameter, if adjustment is needed. Satisfactory results cannot be obtained by attempting to ram or contract the nozzle. The air nozzle should be so adjusted as to derive the full benefit of the injector effect. For instance, after the firebrick linings have become sufficiently heated to bring a furnace to its maximum heat, when the lever-handle air cock is wide open, a reducing or gas flame should issue from the furnace vent. The pressure in the gas pipe need not be more than 20-tenths.

Various Forms of Burners.—Some types of burners used are described below. In these burners no outside, or secondary, air is required for complete combustion, and as a rule any furnace will give better results if closed tight at the bottom.

Fig. 2 shows one of the 8 burners used in the No. 1 Oven Furnace, illustrating the general method of putting blast burners in oven furnaces having a firebrick lining, into which the burners are inserted.

This recessing of the burner serves the double purpose of protecting it from the heat, and also of maintaining the flame, as it has been found that this type of burner cannot be kept lit, if in the open. One of the most interesting features of the use of gas with air pressure is the devices that are used under different conditions for the purpose of keeping the flame lit.

In the burner shown, attention is called to the small radiating orifices *A*, which surround the main burner opening *B*. Without these orifices the main flame would blow out, and even with the orifices the flame is maintained only when the end of the burner is surrounded by a projecting hood like the firebrick shown. Why the orifices and projecting hood act as they do is a matter of theory. Probably the small size of the tubes, and the fact that the mixed air and gas issuing from them impinge on the hood, so reduce the speed at the point of combustion that there is less tendency to blow out. Then, too, the

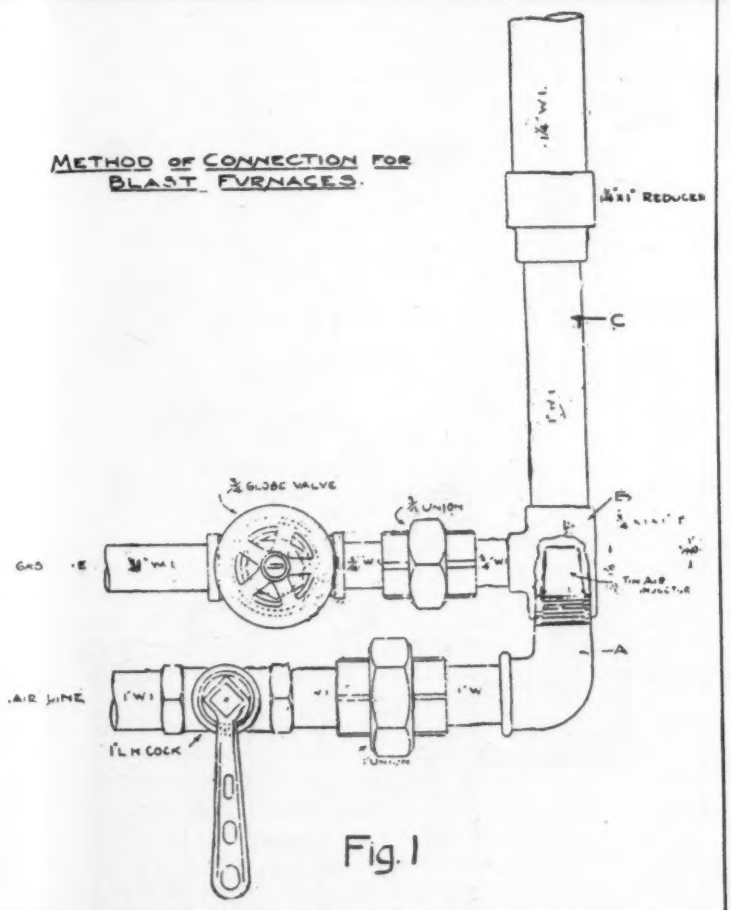


Fig. 1

walls of the projecting hood protect the tender flames from side draughts.

The gas and air mixture can be kept lighted when it issues from one central opening at the burner nozzle, provided the flame plays against a firebrick or other surface, located close in front of the nozzle; but it is not as certain to stay lighted as the construction described above. Also, in some circular furnaces, burners of simple nozzles are used, by arranging 2 or more burners around the circumference, so set at a tangent that the flames play around the circular wall in the same direction and thus tend to keep each other lighted.

Ferrofix Brazing Head.—Fig. 3 shows the ferrofix brazing head, the construction of which permits keeping the burner lit in the open. The principles are the same as in the former burner shown by Fig. 2. The secondary flame issues from the annular slit *A*, instead of from small orifices, and the projecting hood is the wrought iron pipe *B* instead of firebrick.

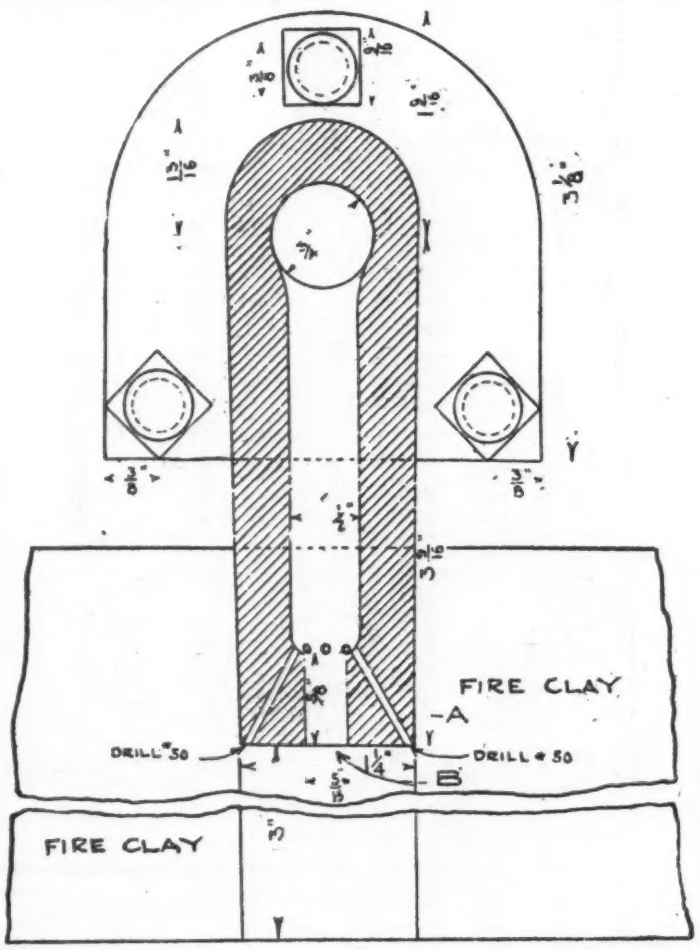
When using the Ferrofix head in constructing home-made brazing furnaces we found that the head burned out very quickly. To overcome this, we protected it from the heat by cold-driving it in a cast iron collar. This collar is 3 inches long and ⅛ inch thick. The face of the wrought hood *B* is recessed 1 inch in the collar. When fitting a collar to a head care must be taken not to close the circular space *A*.

We have put the Ferrofix head to the following uses:

Home-made cylindrical brazing furnace equipped with 5 heads (the protectors being used) for brazing flanges on the large copper steam pipes of locomotives. We also used one head in a small furnace for the smaller copper pipes.

Two heads were placed under the vaporizing cap of a 125-horse power Hornsby Akroyd oil engine. The cap must be heated to a dark red before the engine can be started. The 2 burners enable the consumer to start the engine in 15 minutes. We have 10 sets of these burners installed for this purpose. These burners replace the oil lamps originally furnished by the engine manufacturers. Three heads were put in the firebox of an old charcoal brazing furnace. It is used for brazing the bottoms in copper pans of all sizes. Two heads were adapted to braze the joints in ice cream cans. Fig. 4 shows the Ferrofix head adapted to braze the copper cylinders of chemical engines. We used 4 heads here, as some of the cylinders are made of ¼-inch copper and a large volume of flame is needed. We also put a ring of heads around a very large cauldron previously heated by steam. This cauldron is used for manufacturing axle grease.

The Machlet Burner Tip.—Fig. 3 shows the Machlet burner tip.



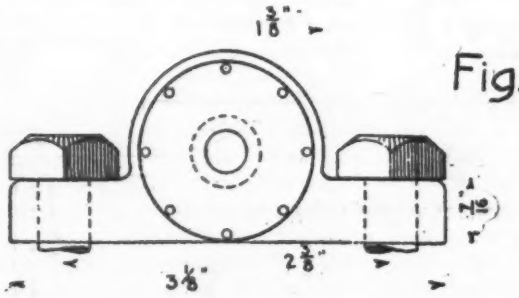


Fig. 2.

BURNER USED IN NO 1 OVEN FURNACE

The construction permits of keeping the burner lit in the open. The principle of maintaining the flame of the burner is similar to that used with the Ferrofix head. The ribbons *A* are recessed ¼ inch in the shell *B*. This prevents the draught of air from blowing or sucking out the small flames which burn from the ports *C* and *D*. The pressure of the gas and air is probably sufficiently cut (due to its impinging on the part *E*) to hold the flame to the burner. With this burner it appears that the small flames burning at *D* act as pilots to the flames burning at *C*. The tips are made of one size, ⅛ inch diameter, and can be set in rows in pipe burners of straight or circular form, or arranged in clusters, etc.

We have used the Machlet tip in the following home-made appliances: Japanning ovens for enameling the frames of baby carriages, velocipedes and skylight frames; also, under tinning furnaces and sawdust driers.

The Ribbon Burner.—Fig. 5 shows the single ribbon burner. The feature of the ribbon burner is that it gives from end to end a continuous line of flame of uniform size, thus rendering it useful for such purposes as singeing fabrics and roasting coffee, where a line of separate burners, with spaces between the flames, would not answer.

The ribbon burner has been utilized as follows: Under the 6-foot cylinder of an old coal, coffee-roasting machine, the capacity of the cylinder being 350 pounds. Two ribbons were set in a pipe paralleling the cylinder, so that the two lines of flames impinged on the cylinder at an angle to each other. One of our customers was using a machine of German manufacture for singeing tapestry. The gas flame issued from a slot about 4 feet long, the slot being formed by 2 bevel-edged

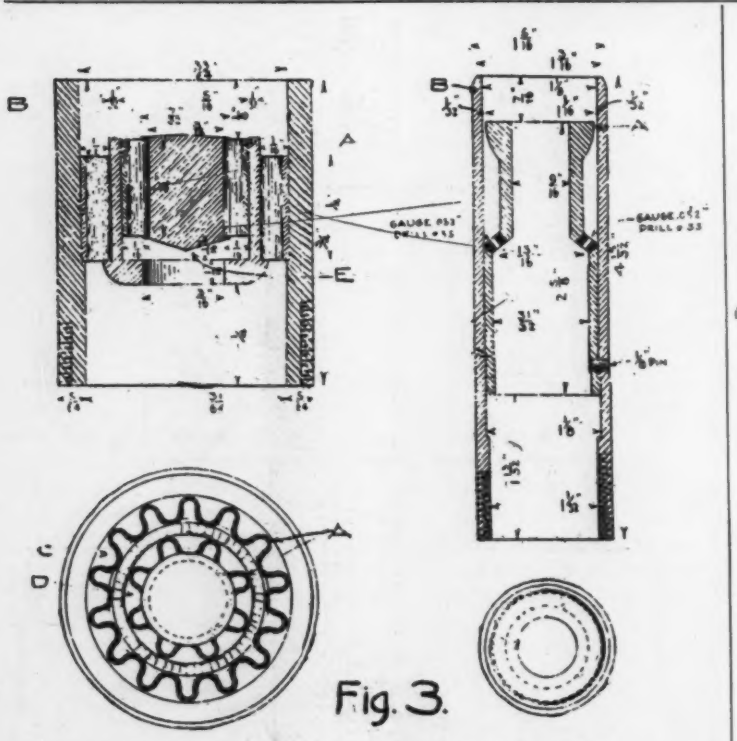
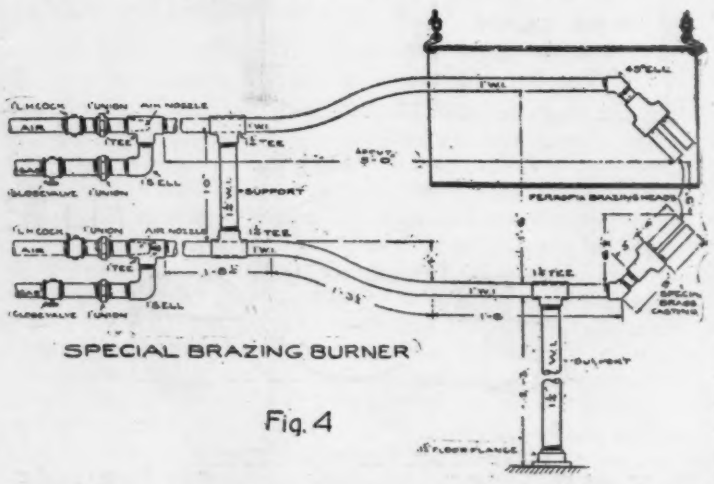


Fig. 3.

MACHLET BURNER TIP
SCALE 4-1

FERROFIX BRAZING HEAD
SCALE, FULL SIZE.



SPECIAL BRAZING BURNER

Fig. 4

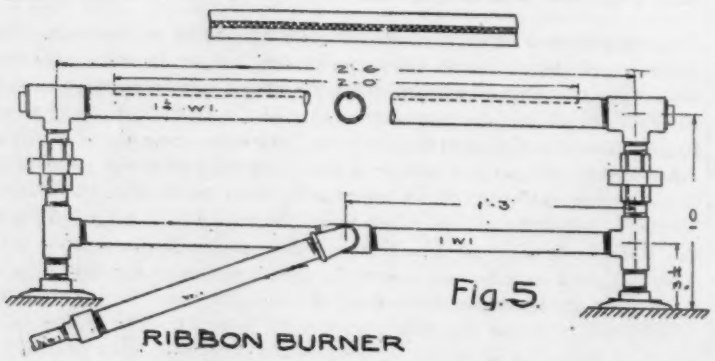


Fig. 5.

RIBBON BURNER

plates which could be adjusted and held by set screws. The flame was uneven and at places intermittent. To overcome this trouble we took one of the ribbons out of a ribbon burner and set it in the slot, holding it by squeezing it between the beveled plates. The result was a steady, even flame, which produced satisfactory results.

Soft Metal Burner.—Still another burner is the soft metal burner, shown on Fig. 6. With this burner an intense heat can be maintained under cauldrons for melting metal, candy, etc. Fig. 6 shows one of the 16 stoves of our own design sold a consumer. It gives quicker results than any stove we know of, treating 40-pound batches of candy in 15 minutes, instead of 30 for the stove replaced. The stove is equipped with the No. 6 soft metal burner. The construction of the burner permits of its being lit in the open. The bottoms of the pans

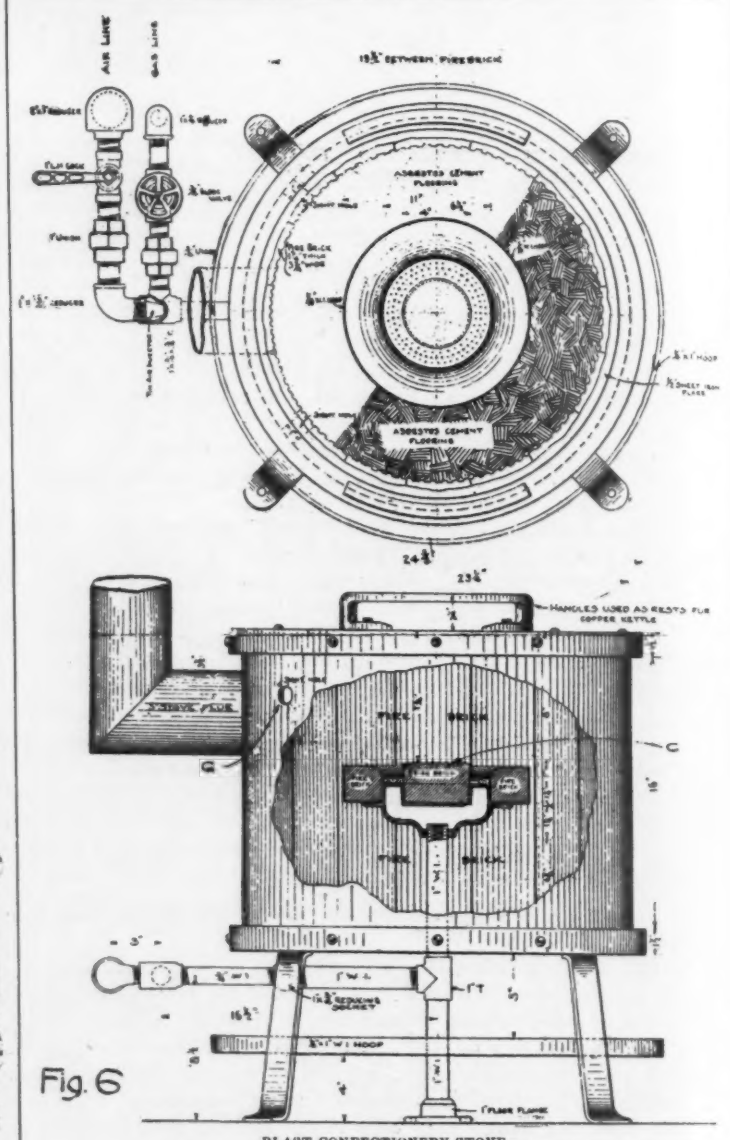


Fig. 6

BLAST CONFECTIONERY STOVE
EQUIPPED WITH No. 6 AMERICAN SOFT METAL BURNER.

come within 8 inches of the plug *C*. A ¼-inch sheet iron flare prevents the flame from touching the pan above the level of the syrup, thus preventing scorching. The sight holes *G* are used to determine the condition of the flame when the pan is in place. When the stoves are not in use the burners are protected from the dust peculiar to a candy shop by sheet iron caps. An old charcoal furnace, used for tinning objects and for annealing copper pans, was equipped with this burner. This burner was also used under pots of old coal furnaces for melting metal, under potash kettles, under kettles for supplying hot water, and in the frames of old coal candy furnaces.

Blow Torch.—The brazing torch, shown in Fig. 7, is a type of burner on the market which is useful for certain purposes. It will stay lit in the open, apparently because the gas and air mixture is burned at a point close to the injector. As already described, if the mixture is piped any distance from the injector, one of the several special types of burners, as described, must be used in order to maintain the flame. This torch was used, as shown in Fig. 8, in a glass bending furnace. The flat pieces of glass are placed on the moulds which set in the furnace on the slab *A*. The heat is then applied through the torch held in the hand of the operator until the glass forms to the mould. It is then removed and placed in an annealing oven to cool. The moulds vary in size, the largest one being 14 inches by 24 inches. To take care of the large moulds the end of one of the torches had to be flattened out to a 2-inch oblong opening, thus enabling the operator to cover the mould with a solid sheet of flame. The flame must cover the mould, otherwise the glass will break.

Relief Valve.—Fig. 9 shows the construction of the air relief valve used on the Reichelm high pressure blower, and in some cases on the furnaces. This valve insures a constant pressure at the air injector of a furnace or furnaces, provided the capacity of the blower has not been exceeded. It also permits the air to escape when not needed at the furnace.

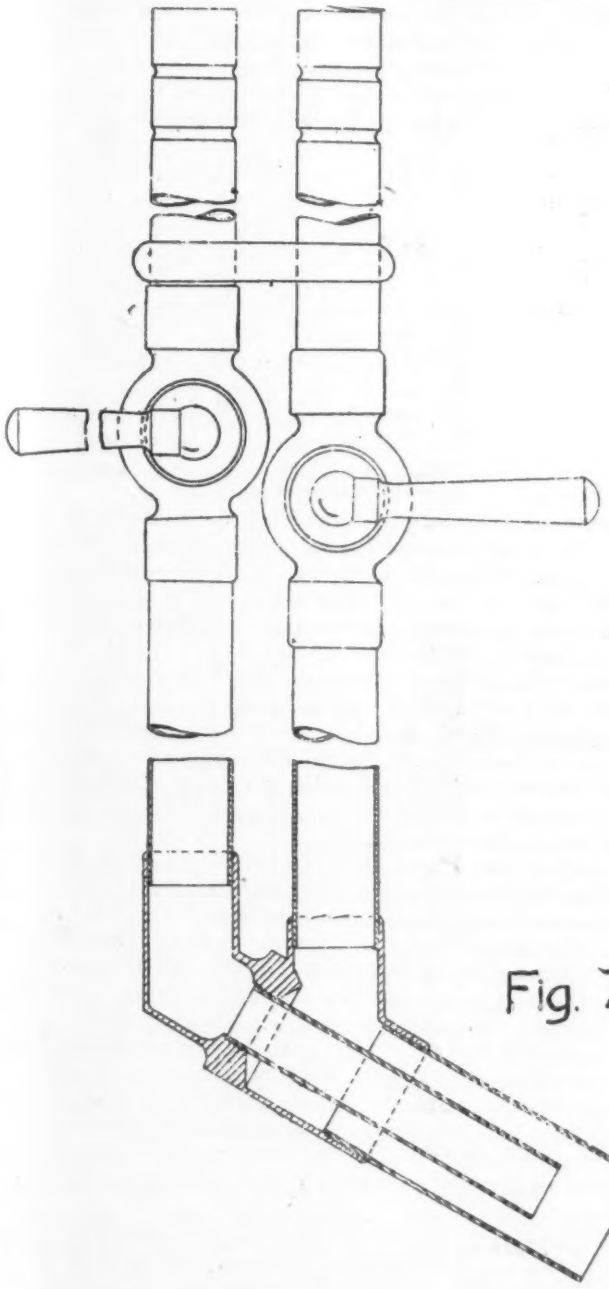


Fig. 7. BLOW TORCH

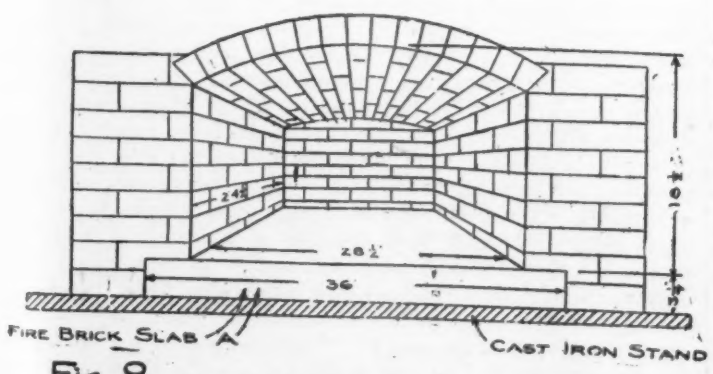


Fig. 8. FURNACE FOR BENDING GLASS

Where a blower is run in connection with a single furnace, having an air drum with relief valve, the valve on the blower can be dispensed with or weighted down, and the surplus air allowed to escape at the furnace. When numbers of furnaces are supplied by one blower, the escape valve on the furnace at the end of the line should be in use, and the valve on the other furnaces and blower may be weighted or fastened down. If the hissing noise made by an escape valve is annoying, the valve may be moved away by extending the connection.

Before starting a new set of appliances, the valve stem *A* is removed and oil is poured into the chamber *B*. The oil acts as a cushion for

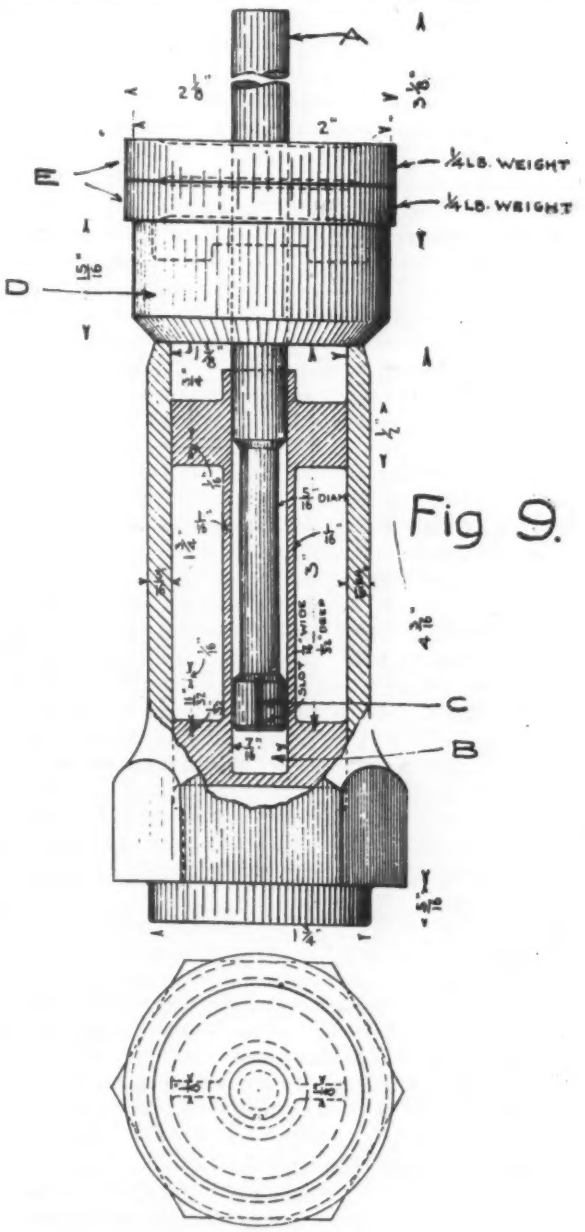


Fig 9.

AIR RELIEF VALVE

the valve stem. The slot *C* in the valve stem permits the oil to flow into the upper part of the chamber *B*, when the stem is inserted, and allows it to flow into the lower part when the air pressure raises the stem, thus acting as an automatic cushion, which insures a steady and non-fluctuating air pressure.

The stem and the attached part *D* represent a pressure of ½ pound. Each of the weights *E* equals ¼ of a pound. Therefore, the valve shown is giving 1 pound air pressure. If for any reason a higher pressure is desired, extra weights may be put on the valve stem, being careful not to carry a pressure of over 2 pounds.

Introduction of Appliances.—A sample line of most useful appliances should be carried in stock and fitted up for practical demonstrations. By advertisement, letters or personal interviews the appliances may be brought to the attention of manufacturers. The last method, especially with one energetic salesman, seems to me the best. This salesman should have a knowledge of the work to be done. Very often this can be obtained by watching the operator do the work by the old method. From this observation he should he able to determine the temperature required to do the work and the appliance or burner capable of generating that heat. It is not necessary for him to know how to treat the material, but only to give the heat. He must first find out the material the prospective consumer is using, what he is doing with it, and the color or heat at which he wants to work it. To the ordinary operator temperatures are unknown quantities, and he judges his heats entirely by the eye, grading them in colors, such as dull red, cherry, bright cherry, lemon, orange, white, brilliant white and dazzling white. These are the terms used by the metal workers. The man operating a china burning kiln speaks of

rose, straw and other colors more becoming to his artistic occupation, while the textile or hosiery worker has no use for a singeing burner which does not whistle when lighted.

After the salesman has received answers to his questions, he should know what appliance to recommend. For instance, if the consumer states that he wants to treat a straight carbon steel, the salesman knows (the size of the work permitting) that a No. 1 oven furnace is required. If the consumer states that he wants to treat high speed steel (the size of the work permitting) the salesman knows that a No. 38 oven furnace is the appliance to install. If the consumer has an appliance installed, using coal, coke, charcoal or oil as fuel, and desires to change to gas, the salesman needs to know the proper burner or burners to recommend, or whether a complete gas furnace already on the market should be substituted. In this case, and also where the consumer may have constructed a home-made appliance, and is in trouble with the burners, the salesman will probably have to consult the engineering or distribution department. In some cases it would be wise to start a consumer off with a small appliance, such as a bench torch, brazing torch, rivet heater, bench forge, or one of the many other small appliances, let him become acquainted with it, let him see what a number of uses these small appliances can be put to in his shop, or allow the salesman to size up the situation and determine whether or not it would pay to connect one of these small appliances on approval. Then have him work up the larger appliances. Of course the salesman will run across some propositions where he will not be prepared to furnish the consumer with the proper information, then he must find out what the consumer wants, and have the office correspond with a manufacturer, stating the nature of the work to be done, and, if thought necessary, parts may accompany the latter. This very often proves a mutual benefit. If the consumer wants to see his work treated before he accepts a proposition from the salesman, let the office arrange for a demonstration with the manufacturer of the appliance, and if thought necessary allow the salesman to accompany the prospective consumer.

Connection of Appliances.—It is customary with us to give out the setting of the blower to some good machinist, or the consumer does the work. The blowers are sold under a guarantee, both as to efficiency and durability, and a careful inspection should be made after they have been installed. The blower should be well oiled, should not run over its maximum speed, and it is very essential that it is set level. If the belt used is a new one, see that it is taken up after a short period. A blower not well oiled will stick, and the wear on the bearings will be heavy. If a blower is not set level, the blades will bind on the head, causing them to stick, and there will be an uneven pull which will rapidly cause a leak through the bearings. This leak can be remedied by using babbitt metal, or a better method is to insert a brass collar. These collars are easily replaced, and the blower need not be taken apart when such repairing is required. Before setting a blower, the shop conditions should be looked into. The shaft from which the power is to be taken may also be running heavy machinery, such as drill presses, grindstones, polishing wheels, or an elevator may be operated. If there is a decided change of speed in the blower, due to the throwing in-and-out of the other machinery, point the defect out to the consumer, and tell him the appliance will give far better results if a constant speed is maintained on the blower. Blowers run by such shafts often cause the following complaints: "Your gas pressure is not steady; sometimes I have plenty of gas, then the pressure drops." A slipping belt, sticky relief valve, oil in the air line, or water in the gas line are also causes of the above complaint, and when such a complaint is received the inspector should take them all into consideration.

Of course, instead of using a blower, the air may be drawn from an existing high pressure system, by the use of reducing valves, provided the volume is ample.

I would not recommend the installation of a melting furnace for melting brass—that is, not for continuous melting with artificial gas at $1 per 1,000. It can be melted for about ½ cent per pound.

This figure is taken from the total melt, and does not include the gates or bad castings. To get this figure we changed the nozzle of the air injector and increased our air pressure from 1 pound to 1½ pounds. We thus received a quicker and higher heat, but at a sacrifice to the linings, which in the end did not pay. This was worked out with a No. 2 down-draft melting furnace, which we changed to an up-draft. Do not connect a lead hardening, soft metal or cyanide furnace with the lighting hole in the front, for if the pot should give way, as happens at times, the hot metal may injure the operator. Do not connect an appliance under an automatic sprinkler. Do not, as a rule, guarantee gas consumption, as the operator can, without knowing it, spoil your calculations by carrying the heat too high or too low. A turn of the gas valve will defeat your reckoning.

Based on computer results, and allowing for a drop of about 50-tenths in the line, we have installed air pipes according to the following rule:

Size of Blower.	Length of Connection in Feet.*	Wrought Iron Pipe to be Used. Size. Inches.
1	0 to 50	2
1	51 " 200	2½
2	0 " 100	2½
2	101 " 200	3
3	0 " 100	3
3	101 " 200	4
4	0 " 50	3
4	51 " 200	4
5	0 " 50	4
5	51 " 200	5
6	0 " 100	5
6	101 " 200	6

*From outlet of blower to air injector where only one appliance is supplied or to first bench line where more than one appliance is supplied.

In every case, the connection, as defined above, should be one size of pipe. For instance, a run of 60 feet from a No. 1 blower should be of 2½-inch pipe. If the air line starting from the blower takes a perpendicular drop, put in a drip with a draw-off cock; you will find that oil from the blower will accumulate in the line. Do not use tin air pipe, as it will cause trouble.

Operation of Appliances.—After an appliance has been sold and connected, the gas company's man should be the first one to start it off. Very often if the starting is left to the consumer the appliance will receive a "black eye." Before starting a new appliance the union between the injector *T* and the gas valve should be disconnected. There should be suction enough produced by the air to hold a light piece of paper to the opening.

In lighting air blast burners, if in the open, first turn on the gas and light it, then turn on the air cock gradually and adjust the gas and air cocks to give a flame of the size and type desired. If in a furnace of inclosure, a small quantity of air is turned on first to create a circulation in the furnace and to expel any possible explosive mixture that may have accumulated. A piece of well lighted paper is then placed as near the burner or burners as possible. The gas is then turned on by a quick turn of the valve. As a rule, one can see the flame or the reflection denoting the ignition. A steady roaring indicates that the burners are lit. Adjust the gas and air valves so that a small blue flame will issue from the vents. With the furnaces having firebrick linings, proper burning conditions are not reached until the linings have become sufficiently heated to permit the normal supply of gas to be turned on.

In shutting off first turn off gas, then the air immediately. The air should not play on the hot firebrick, as it would be liable to crack it. With furnaces having cast iron pots or retorts, oxidation would be occasioned by the air playing on same. To bring a furnace up to the heat required, the maximum gas consumption is needed. After the desired heat has been reached, the air and gas valves should be adjusted until the heat wanted is maintained. This consumption is usually near to that given in the catalogue, but when piping up any of these appliances the pipes should be made large enough to supply about double the quantity of gas given in the catalogue.

Whenever a reducing flame is required, as where steel parts are to be hardened, where cast iron pots or retorts are exposed to the flame, and in general whenever there must be no oxidation of the material in contact with the flame, excess gas must be carried. The presence of excess gas is always indicated by a small blue flame issuing from the vents of a furnace. When a furnace is opened, the excess gas prevents oxidation of the contents of the furnace by the atmosphere. The cement used to lute and repair furnaces is known as fireclay putty. This cement consists of fiber asbestos, cement and fireclay. When wanted for use, it is mixed with water to the consistency of putty. If the furnace is hot, it is well to mix the cement a little thinner to prevent it from becoming dry while using. At times the bottom slabs of oven furnaces (which are firebrick) need renewing, caused by an explosion in the furnace by allowing something heavy to drop on the slab, by allowing the air to play on the slab after the gas has been turned off or general deterioration. The entrance of the furnace is generally of smaller dimensions than the bottom heating space or slab. In such case the slab is put in through a back entrance especially provided, this entrance being closed by luting in what is known as the back slab, and held in place by a plate pulled up with wing bolts.

When a new bottom slab is to be put in an old furnace the back plates and slab are removed. Great care should be exercised in removing the back slab, for in many cases it has cracked and is weak from constant heat. It is best removed by cutting out the fireclay putty from around the edges. This will loosen the slab, and it can then be forced out from the inside by tapping it evenly on all sides with a board. A back slab rarely stands removing more than twice. If the firebrick lining has been cracked it should be luted with fireclay putty. A cold chisel may have to be used to remove deposits from the bottom, after the old slab is removed; then the bottom should be leveled with fireclay putty. The lining at the burner openings may become so deteriorated that it no longer protects the burners, and this should be carefully looked after and well luted, or, if badly burned away, a new lining should be put in.

The new slab is then put in and care taken that the slab supports are in their proper positions, and that none of them obstructs the burner openings. The slab goes flush and level with the entrance sill and must rest on all of its supports, so that it will not rock. A play of ¼ inch should be allowed between the bottom slab and the back slab for expansion. When connecting an oven furnace do not run the gas and air lines in such a way as to interfere with removing the back slab. The fireclay linings used are held in place by plaster of paris, which not only holds the linings in position but also prevents loss of heat. To reline a No. 1 oven furnace, first remove the burners, the front and back plates and cut out the old lining. This leaves the outside case which is fastened to the bottom plate. Cut 8 channels in the new arched lining leading to the sides, 2 on each side of the vents at an angle of about 30° from their centers. These channels will permit the plaster of paris to flow freely over the sides. The channels may be cut with a diamond pointed chisel and the furrows smoothed down with a rough file. Place the lining in position, put on the back plate; then place the front arched slab, which is held in place by the front plate. Mix up a quantity of fireclay putty and lute all crevices, plug the burner openings, being sure that the fireclay putty extends through to the outside case; next plug the vent holes from the inside, then pour the plaster of paris through the vents of the outside case. Be sure that the plaster of paris is thoroughly mixed and very thin; if it is not, it will quickly set around the vents, and the job will have to be done over. Two men should be used to do the pouring, one for each vent. When the plaster of paris starts to overflow allow it to settle. You will find that about a bucketful will be required to finish the job. Allow the plaster of paris to set for about ½ day, then remove the fireclay plugs, insert the burners, and place the bottom slab and back slab in position, as previously stated.

To reline a cylindrical furnace, such as the No. 2 down draft melter, place the lining on an even base, put the wrought iron case over the lining, mix up some fireclay putty, and stuff it down between the lining and the case, thus sealing the bottom, plug the burner openings, then pour the plaster of paris to within about 1 inch from the top, face up with fireclay putty and allow the plaster of paris to set. Remove the plugs from the burner openings in the case and drill the openings for the burners in the lining (linings come undrilled). This drilling is no easy matter—that is, when not equipped with automatic drills. It is best to start the hole with a small chisel, being sure to get the right angle, for if you do not the burners will not work properly. After a small hole has been worked through, ream it out to the desired size.

To reline a No. 2 gas forge, remove the burners, front and back plates, put the new linings in position, mix up the fireclay putty and lute all crevices, plug the burner openings, then place the furnace face down on the floor, level it up with blocks and pour the plaster of paris between the lining and the case at the back, allowing it to set, which, with a small furnace, only takes a few minutes; then put the back plate and burners in place.

To reline the No. 5 lead hardening furnace, remove the burners, top plate and cast iron case, place the bottom slab and oblong lining in position, lute all crevices with fireclay, and plug burner openings; then pour the plaster of paris from the top. Allow it to set, then put the top plate in place. At times it may be necessary to take a blower apart. The Leiman blower is easily dismantled and reassembled, but with the American blower, the reassembling is rather a difficult operation—that is, if one is not familiar with the blower. I have known 2 machinists to spend ½ a day assembling one of these blowers, the great difficulty being the replacing of the segments which travel in the eccentric grooves in the heads. After the head on the pulley side has been put into position, and the segments and blades entered on this side, the other head may be put into position as follows: Place the segments on the blades, push the head up until within about ¼ inch from its permanent position, one man steadying the head with his left hand, while another man turns the pulley in the reverse direction. As the blades with the segments slipped on them come up parallel to the course of the groove, the man holding the head enters the first segment about ¼ inch in the groove, then, as the pulley is turned, the segments already in position will follow the course of the grooves, and the remaining segments will assume their proper positions to be entered.

List of Installations.—The following is a list of the air blast furnaces installed to date in Philadelphia with the purposes for which they are used:

Forges for Treating high speed steel, heating steel parts to harden, forging, dressing tools, brazing, testing building material, bending iron, welding.

Rivet Heaters for Heating rivets, bending small iron parts, brazing, heating steel parts to harden, small forging.

Oven Furnaces for Heating steel parts to harden, annealing, case-hardening, bending special lenses of automobile lamps, pre-heating high speed steel.

The No. 38 oven furnace is used for treating high speed steel, as it is so constructed that a white heat may be carried.

Case-Hardening Furnaces for Case-hardening, heating steel parts to harden, annealing.

Nos. 1, 2 and 3 Soldering Iron Heaters for heating soldering irons.

Self-Heating Soldering Irons for General soldering, soldering leaded glass work.

Assay Furnaces for Jewelry purposes.

Melting Furnaces for Melting babbitt and all other soft metals, lead hardening, cyanide hardening, blueing with saltpetre, melting valuable metals.

The No. 2 down-draft metal furnace is used for testing firebrick. For treating steel for experimental work, and for brass melting.

Muffle Furnaces for Enameling jewelry and other objects, annealing.

Lead Hardening Furnaces for lead hardening, melting soft metals, cyanide hardening.

Brazing Torches for Soldering the bottoms in copper fire extinguishers, general soldering, hardening steel parts, tempering, bending glass.

Ferrofix Brazing Torches for brazing cast iron, brazing cup joints and flanges on copper tubing.

Brazing Tables for brazing parts to electric arc lamps, brazing tubing, repairing parts of machinery.

Oil Tempering Furnaces for Oil tempering—the No. 38 oil tempering furnace is being used to tin copper fire extinguishers, blueing with saltpeter.

Sweep Reducing Furnaces for reducing sweepings, melting soft metal.

No. 10 Cluster Burner for melting lead in small quantities. Used under small home-made oil tempering pots, under potash kettles, supplying hot water, drawing temper, under home-made soft metal pots of small size.

American Three-Way Burner for heating small steel parts to harden, making incandescent electric light bulbs.

Cylindrical Furnaces for tinning, treating high-speed steel, heating long drills and reamers, annealing, case-hardening.

Adjustable Tire Heaters for putting on and removing wheel bands.

Speed Regulators: Sold with automatic heating machines. These regulators enable the operator to pass the material through the machine at the right speed so as it will be heated properly. If the cylinder gets beyond the required heat he speeds the machine; if the temperature drops, he decreases the speed. If the work is light, he speeds it up; if heavy, he cuts it down.

No. 15 Automatic Heating Machine for brazing umbrella rod tubing.

No. 17 Automatic Heating Machine for burning the oil off hairpins and hooks and eyes, and at the same time tempering them. The oil is burned off to allow the enamel to take to the steel.

No. 29 Automatic Heating Machine.

We have 9 of these machines hardening steel balls, the balls varying from $\frac{3}{16}$ inch to 1 inch in diameter. The machine consists of an outer case or body lined with firebrick, in which the burners were inserted. The flames play on a revolving cast iron retort, in which there is a spiral. The feeding chamber is attached to one end of the retort. The balls are fed into the retort by a scoop, which is attached to the inside of the feeding chamber. The spiral works them through to the outlet of the retort, where they are deposited into a bath. We had considerable trouble with the first machine installed, due to the burning out of the cast iron retort. The first retort burned out in about 2 weeks. This burning out was undoubtedly caused by the operator, who did not follow instructions—*i. e.*, to carry excess gas and heat of not over 1,700° to 1,800° F. Under proper treatment, the retorts last 6 to 7 weeks. We also experienced trouble due to the ex-

pansion of the cast iron retort. The collar of the feeding chamber is attached to the retort by machine screws. The rollers which support this end of the retort run on the collar. When the retort expanded to a certain point, the rollers slipped off of the collar on to the retort, thus allowing the retort to drop about ¼ inch. I am of the opinion that this has a great deal to do with the breaking of the retort. This dropping of the retort was overcome by putting a device on the machine which permitted the rollers to be adjusted.

Mr. W. H. Allen, of Newark, N. J., here read the following on

AIR BLAST GAS APPLIANCES.

The objects and purpose of this paper are to treat solely of the blast or industrial gas appliance, its value to the gas company, and the largely increased consumption derived by its introduction and use. Not until within the last few years have gas companies shown much interest in development along these lines, because they have not fully realized the value and importance of the industrial possibilities of their business. I feel warranted in making this assertion from facts, and base my proof upon personal experience and observation. The numerous inquiries constantly being made by gas men prove conclusively that these appliances are not as universally known and understood as they should be.

Every gas man is familiar with the gas range and what it has accomplished and is still accomplishing from the domestic point of view. They have satisfied themselves of its merit and know what a valuable adjunct it has proven by the greatly increased sales of gas derived from it. Having demonstrated the worth of the range for domestic purposes we should now turn our efforts to larger avenues for increases by putting the same amount of energy and enthusiasm in the sale of these industrial appliances for manufacturers as hitherto displayed in the sale of household appliances. They recommend themselves as a source of greater revenue because they show far greater consumption than the ordinary domestic appliance. This is due to the increased length of time they are in use; for, in the application of the law of averages, they stand out as an all-day load.

If you will stop to consider that a single one of these industrial appliances is worth far more, has a much greater consumption with approximately the same cost per installation and brings less trouble and complaint during the course of the year than a gas range, the sale of such a business-bringer cannot fail to appeal as worthy of more consideration and investigation than has heretofore been accorded it.

As an example of the value and benefit a gas company may derive from the sale and use of these appliances, permit me to mention the consumption of 10 actual consumers during 1906 which was 73,771,700 cubic feet. For a period of 3 years the same number aggregated a total of 261,697,000 cubic feet. Further, a recent sale just completed to 1 consumer calls for a demand of 10,000 cubic feet per hour on a ½ capacity at present. When in full operation the total consumption may easily be figured. In addition to the above, many hundred more could be mentioned who are using gas under like conditions, but to quote the consumption of all in use in a certain territory would, I am afraid, appeal to many of you as preposterous, and might be considered questionable.

Again, as to the increase in the sales of these appliances, it is interesting to note that in one district for 1905 there were sold 228; in 1906, 466, and for the first 6 months of 1907, 160. I mention these facts to show you the gains which are being made solely by energy and effort in pushing this end of the business. To do this it is necessary to appreciate the value and importance of availing ourselves of every opportunity to educate the unlearned, to convince the skeptical and to prove to the doubtful manufacturer, that, by the use of gas appliances, economy and greater results are obtained than by the use of other fuels. The line of appliances which we have adopted and recommend to our customers we have thoroughly tested and found to be of good construction, efficiency, durability and perfect in every respect. Further, the guarantee, liberality and fairness of the manufacturers of appliances which is afforded by a 60 days' trial insure us against loss in demonstrating them.

There are a number of manufacturers of industrial appliances, but after experience we decided to confine ourselves exclusively to one line in order that our men might become familiar with it and be able to make adjustments and repairs with facility. The various manufacturing applications for which heat—by the use of gas or any other fuel—is required are melting, boiling or fusing and the many and numerous uses to which gas devices can be applied to these, either for manufacturing, laboratory, metallurgical or chemical purposes, are inexhaustible. The appliances most universally called for and which are in most general use are the following: Case hardening, annealing, oven, tempering and melting furnaces; forges, blow-pipes and heating machines.

When special burners or devices of any kind are required (not made, or carried in stock) we take it up direct with the manufacturer and they are especially designed and made for us. When this is done they are guaranteed the same as any regular appliance. A few special adaptations where the use of gas has proven successful, displacing other fuels, may prove of interest.

One of these is a device for mirror drying. This was made in the form of a large oven; the dimensions being about 16 by 8 by 4. Two longitudinal burners were installed at the bottom and the plates of glass of various shapes were placed on top and resembled in appearance an enormous cake griddle. The coal process was formerly used, but with this gas device a great saving of time is accomplished and no expense is incurred to keep up heats—a requirement necessary when other fuels are used. With this new device the heat is obtained a few minutes after lighting and is ready at all times.

A heating machine for hardening, annealing and other processes of which we have a number in use, is also interesting. In one jewelry manufacturing establishment where it is installed 25,000 small steel tubes are annealed daily. This machine does the work perfectly and has proven a great saving to the manufacturer in two ways: First, because of accuracy of temperature, there being apparently no loss of stock from overheating; and, second, because formerly it was necessary to have this operation done outside the factory, which occasioned a loss of time. A machine of this type is in use at the pencil factory of the Joseph Dixon Company, Jersey City, N. J., where the small metal caps used on pencils are annealed, and enough of these caps are prepared in one day to supply the pencil output for a month or more. Its one great feature is the absolute uniformity of the desired heats. This particular appliance requires no skilled labor and an increased amount of work can be produced by it. It feeds itself automatically from a hopper, which a boy can operate.

Another device is a burner used for drying out barrels, hogsheads and vats, especially adapted to breweries. Numerous storage casks and vats used in breweries have to be dried out occasionally to prevent them from becoming too thoroughly saturated with liquor, and to keep them from souring, which affects and destroys their contents, entailing considerable loss when not properly cared for.

Formerly, and in many places they still use, a small charcoal furfurnace, which requires at least 2 days for the drying. The gases incident thereto are very objectionable to the workmen, and at times have resulted in asphyxiation. With the use of a small gas burner large casks may be dried in 8 hours and smaller ones in 3 or 4. Brewers will appreciate the convenience as well as the time saved by the use of this appliance if properly presented to them. As there are many of these institutions among our Western friends, especially in the vicinity of Milwaukee and St. Louis, these appliances deserve their consideration.

Among the desirable features of all air blast and industrial appliances are: Better work, more work per unit of time, less labor, cleaner conditions, less fire risk, less room, less skilled labor and a greater uniformity in work produced. In addition to these there is the absolute regulation of temperature by which the most exact and critical heat requirements may be obtained, whereas with other fuels this is almost impossible. Then there is not only ease but rapidity with which any desired degree of heat within the range of gas can be obtained. As you all know, these features are very essential and important in all lines of manufacture, and quite indispensable in the treatment of metals and many manufactured products. Under their possibilities of perfect control, the mechanic, by his practiced eye, can readily judge the condition of his work without undergoing the labor and trouble necessary where other fuels are used. To further enumerate would occupy your time unnecessarily, for I am well aware of your familiarity with many of these devices.

As a suggestion, I would say that the catalogues issued by the various manufacturers not only illustrate their many appliances but are also descriptive. A well-defined outline is usually given of every appliance, telling what it will do and the purpose for which it is made. This enables one to decide without much trouble the kind and size of appliance he needs by the nature of the work he wishes to perform.

The various uses to which these air blast appliances may be put need not be enumerated, as they include all processes known to the manufacturing world. Without fear of contradiction, I think we have installed nearly every made type, in one style or another, and to

describe their working would be futile. They are in operation and give entire satisfaction, and to have one returned is an exception. Their value and worth are fully appreciated and cheerfully recommended by all manufacturers in our territory using them.

In interesting manufacturers, as a rule you will meet with objections on the part of workmen, who, as many term it, are "up against it." Especially is this true where a superintendent has inaugurated or installed an idea of his own and does not wish to have another supersede or prove a superior method. You will meet obstacles and find it hard to make progress at first; but by tact, liberal terms and free trials, success will follow in most instances. Many times it has taken months to perfect a sale, but we eventually win by conclusively proving superiority and economy. The latter is the most convincing argument to manafacturers, and is the chief aim for which all are striving. Owing to the keen competition of to-day this is especially true in the production of manufactured articles. In order to obtain good results and accomplish the purpose of interesting manufacturers in these lines, constant and regular visits should be made. Spasmodic visitations are not appreciated and do not result in any real good. After sales are made it is well to learn from your customer whether the results obtained are satisfactory and meet expectations. Show him that you take an interest in his welfare, as it may result in further sales. Also see that promises as to efficient service are fulfilled, thus keeping good faith.

With reference to the various kinds of air blast appliances made and offered for sale, I think extreme care and judgment should be used in their selection and adoption, for if they are found to be of poor construction, inefficient and expensive in operation, they will prove disastrous to you, and all your efforts in that direction will be fruitless. Therefore, let me advise you to be careful in taking up and approving any that have not been tried until you have practically demonstrated its worth and capability of performing the work for which it is designed.

In conclusion, I think the subject is one which should and must interest and appeal to all gas men. I think it behooves us to push this branch of our business vigorously and to the utmost, using every opportunity to increase a demand for our commodity. The large and almost unentered field afforded by the use of gas for mechanical purposes should engage the serious attention and enlist the activities of everyone identified with this industry. Both the manufacturing and the commercial end of a gas company should take a keen interest in the steady advancement and promotion of the industrial uses of gas. Its possibilities are only in their infancy, and we can scarcely form any clear conception of the ultimate growth in gas consumption to be derived from an intelligent and energetic prosecution of its sale along the lines indicated by this paper.

The paper by Mr. S. Tully Wilson, of Denver, Col., was then read as follows:

AIR BLAST GAS APPLIANCES.

In visiting a number of large cities recently, the writer has been surprised at the comparatively small amount of attention which is paid to the industrial gas appliances. We know that they are almost invariably splendid revenue producers, not only because they consume considerable gas and run long hours, as a rule, but because the consumption comes usually at the time when it is most desired—that is, in the valley of the load curve. Unlike domestic fuel appliances, they produce about the same revenue for each of the 12 months, require little attention and are usually paid for in full soon after their installation; and yet few managers will permit an expenditure to obtain this class of business pro rata to the consumption, compared to domestic appliances.

Every new domestic fuel or illuminating consumer you take on just adds so much to the necessary size of your manufacturing and distributing equipment, while most industrial consumption comes during the hours when the equipment is least taxed and assists toward the straight line load curve for which you are all striving. It is noticeable that those companies having the best reputation for business acumen and good results are almost invariably pushing industrial fuel appliances.

Rivet heaters, muffle furnaces or tempering and annealing furnaces, consuming gas at the rate of 200 feet an hour and running 6 to 10 hours a day, are certainly very desirable appliances to install. Compare the revenue from this class of business to the revenue obtained from domestic appliances. Considering this matter of revenue, the time when the consumption takes place must not be overlooked, for if we consider this point we can well afford to sell gas for such purposes at a lower rate and still obtain the same or greater profit than we would from the domestic consumption. The first essential in an industrial appliance campaign is to obtain the services of a man who is familiar with the appliances available on the market, who is capable of adopting appliances and burners to uses for which they were not specifically intended and of good commercial training. This means practically a commercial engineer, and there are not perhaps many available; but an engineer and one or more commercial men can produce wonderful results.

It is necessary with nearly all air blast gas appliances, and many industrial appliances working without blast, to have them installed by an expert and have them demonstrated before the purchaser can undertake to operate them himself, for it is possible for him to have an explosion which may make him afraid to continue its use, or what is more likely, he will get a poor adjustment which will not produce the desired results, when he will condemn the appliance. If the first gas appliance installed is successful, it is usually an easy matter to install others which you can recommend, and with subsequent installations, your customer will be much more patient; but the greatest of care should be given the first installation as your future prospects depend much upon it. This applies also to the first installation of any new class of appliance, for usually the first question asked will be, "Who uses one?" and the subsequent sales are always facilitated if a similar appliance is being successfully operated by a competitor. It is frequently a problem for the salesmen to know when to recommend the air blast. He knows frequently that he could make a sale of the appliance if it were not for the cost of a positive blower, and frequently a motor also; and often he will install an appliance without a blast against his better judgment because of the difference in first cost. This problem seems to be one entirely of temperature. We do not believe it necessary, nor desirable, to have blast for a domestic gas range, yet to melt gold or iron we know that it is; there must be a line between these two points.

The Fletcher concentric ring burner will probably produce as high a temperature, if properly applied to a furnace, as any other. It is widely known and used, yet an ordinary Bunsen burner of the same capacity or consumption equaled it in laboratory experiments and in practice at a considerably less first cost. With a gas of moderate calorific value, crucible assays of precious metals can be made without a blast; it is slow and not commercial, but this gives an idea of the limit of possibilities.

Soldering iron furnaces are frequently used with a blast, and yet it is not even desired to get the temperature of the iron above 1,000° or 1,200° F. at most; it would seem, therefore, that, if the furnace were properly constructed, a blast would not be necessary. We have used with marked success a soldering furnace which has two chambers that will each just hold nicely a large soldering copper, and each is heated independently. The burner is placed below and to the side of the copper—the flame issuing horizontally, circling the iron and passing out a flue above the burner. The furnace is well lined with insulating refractory material and gets very hot with only ordinary gas. They make use of the reverberatory principle in this furnace with marked success.

In tempering tools it is customary to use a blast, while the temperature required for this work can easily be obtained without, as has been demonstrated.

They make a tempering and annealing furnace in which temperatures approaching 1,800° to 2,000° have been obtained without a blast, and this has been demonstrated as ample for this class of work. Parts of rock drills which require a very uniform temper are being very successfully handled in several of these furnaces. Another good illustration is the firing of china, which is done perfectly without a blast.

These examples are given as illustrations of the limit of temperature obtainable in practice with atmospheric burners.

When a temperature of 2,000° F. or over, is required with ordinary coal gas, a blast must be used; but here again there is plenty of room for variation. If the temperatures illustrated can be obtained without a blast, will not a slight blast augment these temperatures? It naturally should, and this theory has been verified in the production of a muffle furnace, which, as has been frequently proven, gives ample heat for crucible and scorification assays and cupelling in a commercial way, with a blast furnished by a 33-watt motor directly connected to a blower, attached to the frame of the furnace and the whole apparatus at a moderate expense. The next step in air blast comes with the positive blower, operating usually to produce a pressure of 1½ to 2½ pounds. With this much air pressure it is an easy

matter to melt silver, gold or wrought iron, as we have obtained over 3,200° with 1¼ pounds of air, and gas of low calorific value. The American Gas Furnace Company have long been leaders in the production of this class of goods, the United States mints using their muffle and crucible furnaces with splendid results.

The Chicago Flexible Shaft Company, of Chicago, have also done good work in this line and have produced a number of furnaces of very pleasing and practical design and successful operation. The Improved Appliance Company have made a rivet heater working with blast which has proven quite a success; 3,000° are easily obtained with this appliance. If the flame is properly adjusted there is no trouble with scale whatever, and, as may be seen by the temperature mentioned, the rivets may be easily melted, and forging or welding may readily be done in this furnace. But a list of all the appliances available for the commercial engineer would be so long as to be impracticable.

This paper is intentionally superficial. it being the writer's opinion that there are but few men in this Institute who would bear with the details. Only a few appliances and manufacturers have been mentioned, but to those who wish the names of the manufacturers of gas burning appliances of any description, I will say that I have much of this data available, and will take pleasure in answering correspondence on this subject.

Discussion.

The President—We will proceed to the discussion of the papers read.

Mr. Terry—Regarding air blast furnaces, one point that I wish to bring to the attention of this meeting is the actual consumption versus the builder's rated consumption. In our district, we recently made some tests of some air blast appliances; the consumer operated the furnace while a representative of the Gas Company took the readings of the test. The results showed that the actual consumption was 100 per cent. more than the builders' rating. In an investigation of this, by the maker of the gas appliance and the Company, we found the difference was in the way the furnace was operated. A slight change of adjustment brought the consumers' rating to that of the builders' without changing the heating value. I think a periodic inspection on the part of the companies would result in better feeling on the part of the consumer towards us, and also lead to the installing of more appliances.

The President—Mr. Barnes, I am told we may hope to hear from you on this subject.

Mr. Barnes—If you would kindly tell me what you would have me say, I shall be very glad indeed to say it. That probably is an evasive means of approaching the subject, but I know of no hard and fast rule that could be laid down for procedure along the industrial line. I, by all means, heartily agree with Mr. Allen, that the gas companies in general have neglected or overlooked this means of disposing of their product. I think I am justified in saying that the root of the evil lies in the fact that the company has not had available a man or men suitably schooled for the work. Ordinarily, when a proposition is laid before you for consideration, the first step taken by you will be to mentally note the caliber of the party presenting it. For instance, take our friend, the engineer. If someone walked into your works and stated that he had the details of some new method of producing water gas you would at once sit up and take notice, sizing up your visitor in a twinkling; and if your impression of him were favorable you would probably lay down your pen and listen a while. If, on the other hand, your mental note of the man did not impress you, you would probably be extremely busy at the moment and beg to be excused. Now what is true of yourself is equally true as regards the busy manufacturer. Following this line of argument, some of the trouble may be easily traced, the average manufacturer having many propositions confronting him—an outcome of competition—has not the time to devote to a man who but vaguely understands the proposition he is endeavoring to present. Then, again, human nature plays a strong part, and in favor of the gas company when the industrial branch of the industry is being considered. If you can get something for nothing you generally make some effort, however slight, to secure that something. Now the point is if the manufacturer realizes that the representative of the gas company calling upon him has some knowledge, some process or some suggestion of merit, the principles of which will be given gratis, there is no question but what our gas company man will receive a courteous welcome. I feel obliged, gentlemen, to repeat my opening remark, that if you will give me the cue as to what to say I will say it, for it is extremely hard to bring out points which can be applied broadcast, there are so many propositions in the industrial field, the principles of which are identical but of which the application is manifold. Two concerns may be producing almost identically the same goods, both as to style and grade, yet their mechanics in the furnace room or machine shop, having been schooled along different lines, handle the details of the product differently, therefore, it is absolutely imperative that a man, to make a success of the industrial department of a gas company, must understand not only the principles involved by the application of heat to iron and steel, but also the various ways of application and the different results which will be obtained. The foundation for this knowledge may be readily gained, as some of the gas furnace manufacturers are glad to admit a man to their factories who comes with the indorsement of a gas company as the industrial man. I would suggest, gentlemen, that a few inquiries be made at your local manufacturing plants wherever a heating operation of any kind is likely to be used. If the plant is using coal you can save them money and produce an absolutely uniform product by introducing gas as a fuel. The one, all-important point in connection with this industrial department is the selection of the man to push the line. He must have a natural tendency for mechanics, for he will be called upon to figure, not only the furnace proposition but blower requirements, horse power to maintain the blower, shafting, pulleys and belt stress. I do not know that I can say any more, other than for those of you who are interested I will leave with the Secretary a number of photographs, taken in Hartford, of equipment installed within the last year and a half. You will find no printing matter in connection with the photos, but I shall be glad to answer any questions regarding them. I thank you.

The President—Any further discussion of the papers?

Mr. Donald McDonald—Mr. Eavenson and Mr. Allen have both shown so much knowledge of this class of apparatus, that I want to ask them if they have ever tried to pre-heat the blast air as a means of getting higher flame temperature. I have done that, and obtained a very much higher temperature. While we have tried it, we have not tried it in such a way that I feel that I know very much about it, and I would like to know if either of those gentlemen has had any experience along that line.

Mr. Allen—I do not think I have ever tried that. I have heard of it, and appreciate that it might be done, but I have had no experience.

Mr. Donald McDonald—On natural gas without an air blast you are not likely to get anything like the temperature necessary for brazing, but by pre-heating the blast air we got quite an increase in it. It seems to me that that points to a way of getting very much higher temperatures where such temperatures are needed. It may be that you have come across a blast furnace which you would use in doing that. I would like to hear the matter discussed.

Mr. Eavenson—We have tried heating the air just before it was mixed with the gas. We also tried heating the mixture just before it reached the burner, but without noticeable results over the old method.

Mr. Donald McDonald—I would be afraid of that for two reasons: one is that you might drop lampblack, the other is that you will get explosions if you mix hot air and gas before the point at which you want the flame. You do not take either of those risks when you do not heat the gas, and air being 8 or 10 times as heavy as gas, there is very little loss in heating the air and not heating the gas.

Mr. Stone—I do not see why Mr. McDonald finds it necessary to heat the air.

Mr. McDonald—So as to get a higher flame temperature.

Mr. Stone—I think it can be done and save all that work of preheating the air.

Mr. McDonald—How do you mean? By forced draft?

Mr. Stone—Do you use natural pressure or forced draft? I think you can get the same temperature that you are after by depending on the natural pressure.

Mr. McDonald—Which do you use?

Mr. Stone—We use the blast furnace forced draft.

Mr. H. L. Doherty—I believe Mr. McDonald, if he will make some careful tests, will find that he gains nothing in flame temperature by putting in the air in that way. Practically, there does not seem to be any gain in flame temperature by preheating the air, although theoretically, perhaps, it would seem as though that should be done. I think practical results have shown that preheating the mixture or either element, or both elements, does not increase your possible flame temperature, and that you will not get a very high temperature by heating the air. On a series of tests that we carried out we were unable to get any increase in temperature by heating the elements. We could not explain the reason why, but in some industrial work where that was tried on our producers, and where we wanted to get a higher

emperature, that was the result. My own theory of it is that the nitrogen which we ordinarily consider as inert, when it is introduced, exerts an influence and excess heat goes to form some nitrous oxide, and these oxides do not break up again until the temperature goes below that point. We got practically the same temperature on our experiment by preheating the air as we did without preheating. It may not be the same under all conditions, but as we tried the experiment the result was we had an increase of economy but we did not increase the flame temperature.

Mr. Donald McDonald—I have found out what I wanted to know, provided it is true. I have always understood that flame temperature was that point to which the combustion of a fuel was capable of heating the products of that combustion, and, therefore, if you heat one of the elements of this product of combustion first, and do not get beyond the point at which the two elements will combine, I cannot understand Mr. Doherty's contention that you would not get a higher flame temperature. I wanted to get the views of some of the other members, and I am much obliged for the expression of opinion which has been brought out. The experiments which we tried could not be dignified by calling them scientific, and I wanted to know what the experience of some of the others had been.

Mr. H. L. Doherty - By pre-heating the elements you add wonderfully to your economy in some classes of work, and it may add to the flame temperature, but I believe from the experiments that I have made that it does not. I think it would be interesting if we could have the opinion of others, or the testimony of those here who have carried on experiments of that sort with regard to this matter. I am inclined to think Mr. McKay has tried some experiments on this subject. I know that theoretically you ought to raise your flame temperature just as much as you pre-heat, but that is not what you get in practice.

Mr. Henry I. Lea—In the application of producer gas made for the operation of engines we have tried that and think we can get quite an increase of temperature by preheating the air. For instance, in gas made from anthracite coal we have been able to maintain a temperature of 2,000° or a little higher without preheating, but by running the waste gases through a series of flues, heating the incoming air and gas, we have been able to carry it up to 2,850° F. I suspect that the results which Mr. Doherty has arrived at in his experiments were due to burning the gas in some sort of furnace in which the radiation or other incidental losses have borne an undue proportion or a variable proportion. I do not know what conditions these experiments were tried under, but I am very certain that, under the conditions we had, we did get a higher temperature by taking advantage of recuperation. We tried it time after time, checking our results with Le Chatelier pyrometers in duplicate, both duly tested.

(To be Continued.)

Hempstead Prefers Gas Lamps to Electric Lamps.

By H. Thurston Owens.

The handsome, aristocratic and heretofore somewhat somnolent town of Hempstead, L. I., has long had a gas works, the inception of which was traceable years ago to the genius of Mr. Fletcher Harper, the elder, who was also mainly instrumental in placing before the world's readers the great publishing house of Harper Brothers. But even up to a few years ago, despite the exhortations of that most lovable of gas men - dear, lamented Captain W. Henry White - whose summer home had been in Hempstead for long time, the Harper gas plant would not be put in or kept to the condition that a plant up to the gaseous need of Hempstead and its surrounding settlements should be kept. Indeed it was only quite some time after the shocking death[1] of its old time Superintendent and Treasurer, Stephen Powell, that the district knew its gas works would not suffice. Later on the Harpers were sufferers from financial ills, and in the end the gas works were disposed of. After much travail and vicissitude the plant as well as the franchises attaching thereto came into the belongings of Mr. George McDonald, whose virile connection with the Nassau and Suffolk Lighting Company has worked almost a revolution in the artificial lighting of the really charming section of Long Island to which the named Company caters. The face of all that territory is being rapidly transformed by the great improvement brought about through better transportation facilities, and now it is nothing strange to witness, actually side by side, a specimen of the most modern residential structure standing right on the line of a great old farm, whose acres have been worked for well on to 200 years, and whose acres will continue likely to be worked until the "head of the house" goes to his last and longest rest. The streets of the village proper have long been lined with great old oaks, elms and button balls, hence it was, although the electric arc lamps have been in use there for full 25 years, the illumination of the streets was not at all satisfactory. The foliage was so dense that electric arcs were worse than useless and electric incandescents were not the thing. Now, however, Mr. McDonald and his men have solved the problem with gas and Auer lamps and mantles, and the story of the contract and its terms are hereafter plainly told.

The lighting of the streets was formerly accomplished by means of seventy 1,200-candle power arcs, and 111 incandescent electric lamps, rated at 32-candle power each, but on May 1st these were replaced by 290 mantle gas lamps. While the candle illumination was nominally reduced from 87,552 to 23,200, the actual efficient illumination was to every intent changed conversely. The Gas Company owns all of the lamps and fixtures, and does all of the lighting, extinguishing, cleaning, etc., at the contract price of $22.50 per lamp per annum, on a 5-year contract. The services are 1-inch and the standpipes are ¾-inch, the lower end being 1¼ inches, as a protection from frost.

Fig. 1 shows the main street of the town, which street is one of

Fig. 1.—Main Street, Electric Incandescent and Mantle Gas Lamps.

the few not lined with elm trees; Fig. 2 is a view from the Long

Fig. 2.—View from Railroad Station, Hempstead, L. I.

Island railroad station; Figs. 3 and 4 show Fulton street which runs through the town. It is the main highway through Long Island from east to west. Fig. 5 gives a very good idea of a street in the residential district.

1. Mr. Powell, who also kept a shoe store in the village, was brutally murdered about 12 years ago one Sunday evening by a negro, who knew that it was Mr. Powell's habit to carry on his person during certain quarter days the collections of gas accounts made by him.

Fig. 3.—A Dangerous Curve, Fulton Street, Hempstead, L. I.

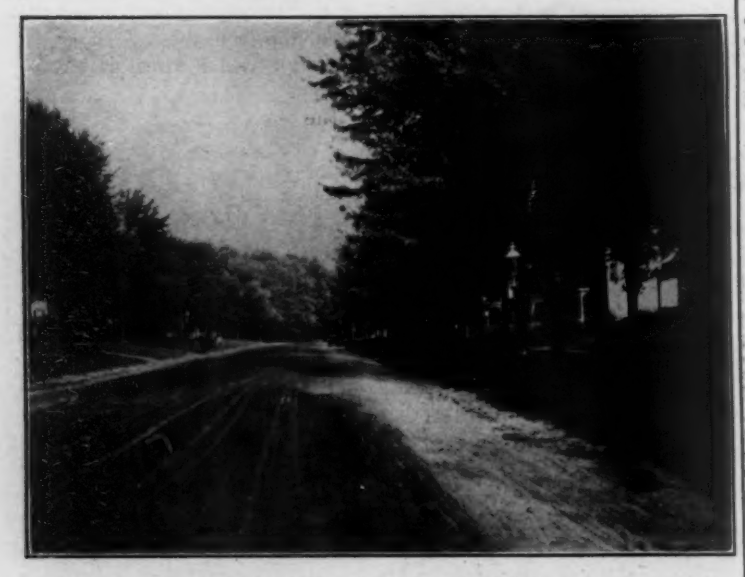


Fig. 4.—Fulton Street, Hempstead, L. I.

Fig. 5.—Residence Street, Hempstead, L. I.

Important features of this installation are that "live" gas men succeeded in waking a supposed "dead" town to its lighting needs on public account, and that the Company felt itself equal in every sense to map out the work for supplying and taking care of the necessary apparatus on its own account. So Mr. McDonald, and his deputy, the spry and observant Mr. S. K. Campbell, with their well trained aides, are to be congratulated over causing 100 lights to glisten where only one shown before.

Gas Leaks and the Locating Thereof.

[Communicated by "ENGINEER."]

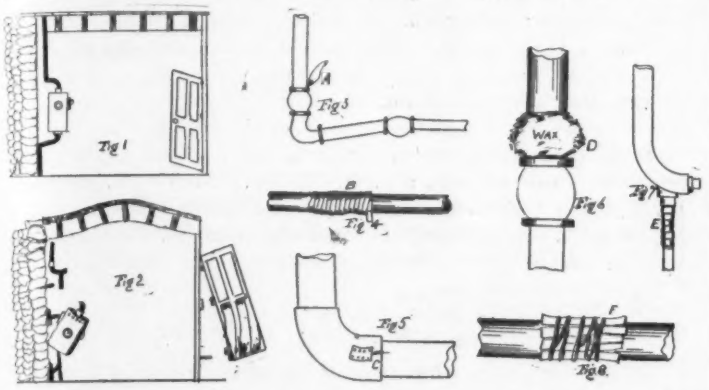
Every now and then we hear of someone or something being blown to pieces, because of carelessness when testing with a light for a leakage in gas pipes; but these accidents are not nearly as frequent now as they were, or before gas companies began formulating stringent rules concerning the carrying of testing lights and lamps. In recent times many accidents have been prevented by the iron-clad regulations of careful companies that require the men to dispense with the old-time and handy torch. However, there are frequent occasions of explosions as a result of the people of residences using torches or lighted candles themselves in a vain effort to locate a leak in a gas pipe. Ordinarily the explosion is due to the fact that the gases collected in some closed apartment. In the event of a leak in the gas pipe, in the basement or room where there is some ventilation, the liability of a gas explosion is, of course, quite remote. But throughout the tenement districts of a large city are many poorly ventilated apartments below the level of the sidewalk through which apartment lines of pipes and the meters are placed. In the event of a leak occurring in such an apartment, the chances are the gases will be held in. Therefore, if someone enters the apartment with a lighted candle or lamp the gases will ignite and an explosion is the result. The gas men will not use any lights when exploring uncertain territory where leaks are reported or suspected, but the man of the house cannot be controlled so readily, hence we often read in the newspapers of gas explosions due to the igniting of gas bodies which have been confined in apartments where leaks have occurred. The sketches in Figs. 1 and 2 illustrate this point. Usually the premises under the flooring or the sidewalk are about as shown in Fig. 1. Everything is closed in securely. A leak occurs at the meter or in the pipes, and there is no escape for the gas. The odor may ooze through and the people of the house noticing it, will either start investigating or may send word to the gas company. If the latter, the gas company will investigate the situation in the right way and no harm will follow. However, when the man-about-the-house takes a notion to investigate, he locates the closed apartment and opens the door leading thereto, meanwhile carrying a lamp or candle in his hand to show him the way. On the opening of the door the confined gases come into contact with the flame of the light and an explosion results. The man will be thrown down or about and be scorched and damaged more or less, and the door will no doubt be broken off its hinges by the pressure. The expansion of the ignited gases upwards will lift the floor beams into the form of a bow, as shown in Fig. 2. At least this is the condition in which the writer found one flooring after an explosion of confined gases below the floor. The meter and the pipes will certainly be ripped to pieces to a greater or less extent, and wreckage will prevail.

The woodwork of the house may take fire. The fire alarm is given and the firemen usually arrive in season to extinguish the blaze and assist the injured. So that particular man with the lighted lamp can be said to have learned a good lesson, and it is quite certain to predict he will never again investigate under similar circumstances. Some men are so careless in looking for leaks that they will take a match from a pocket and ignite the leaking gases about a joint, as in Fig. 3 at *A*. This, of course, is a safe procedure, under common conditions; but if the leak happens to be in a place where the escaping gases can become confined, and if this confined reservior of gas is touched off, then there will be an explosion. If the confined gases are in a very small apartment, such as sometimes exists between walls, or in sections in floors, the explosion will be light and perhaps no great damage done; but it the gases are of considerable volume, a damaging explosion may occur. I frequently meet with men with their eyebrows and whiskers scorched off, due to careless gas leak investigations.

The householder needs watching, and, strange to say, so do the men in shops and offices where gas equipments are in use. In fact, the average apartment house and hotel janitors need special observation. Rather than go to the bother of notifying the gas people, one janitor bound up a leak in a pipe with braid, as at *B*, Fig. 4. A leak developed soon after and filled an apartment and an elevator with gas. Someone smoking in the elevator tossed a cigar outward where the gases were reached in some way. An explosion occurred and a fire was also started in the elevator shaft.

Then patches, as at *C*, Fig. 5, are seen at times, and such patches are sure to leak sooner or later. The inspecting department of the

gas works has its hands filled in searching out these places and repairing them in the right way. The people of the house will look for leaks with a candle, but the gas men rely chiefly upon the soap bubble plan. This is safe. But the gas men cannot all control the people in the houses. The house folks will strive to stop a leak with wax, as at *D*, Fig. 6. In a little time the wax hardens and cracks and the gas escapes through the latter. I saw a leaking pipe bound with cloth, as at *E*, Fig. 7. One could detect the odor of the gas very readily, and the escape was in a factory where they should have known better. A gas pipe was bound up with strips of thin wood, as at *F*, Fig. 8. These



are some of the troubles of the gas inspector. Is it any wonder that he often gets battered, and more often discouraged?

The Payet Automatic Hoist for Purifier Plants.

M. Payet, Secretary of the Société Technique du Gaz en France, has designed an automatic hoist that is attracting attention. The apparatus is in two distinct parts, each the complement and duplicate of the other. The first hoist receives the full skips and elevates them on to the top rail; the second receives the empty skips and lowers them to the bottom rail. Both hoists work absolutely automatically. Fig. 1 illustrates in plan and elevation a skip on its departure from the lower mono rail, while Fig. 2 shows its arrival by the hoist at the upper mono rail. The hoist consists of a length of rail *M*, exactly corresponding to the mono rails on which the skips circulate. This length is suspended by 4 chains, in the form shown from a cross horizontal rail *T*. Such an arrangement avoids oscillation while the skip is being raised, and at the same time it allows of the necessary inclination to be given to the mono rail hoist to correspond with the inclines of the fixed rails. The vertical lift is effected by chains as indicated in Fig. 2, and two guide runs in T-iron insure the steady and straight hoisting of the skip. The lifting chain passes over a return pulley, then round a grooved wheel fixed on to an electrical windlass, next over another return pulley, and ends with a balance weight.

The safeguards that had to be taken were: (1) That only one skip could enter at once on the mono rail hoist, and only when the latter is in a line with the fixed rail; (2) that one skip being at the hoist, all the others are stopped before reaching it; (3) that the position of the skip arriving at the hoist be a fixed one; and (4) that the departure of a skip from the hoist be effected automatically. These *desiderata* were accomplished as follows: When a skip reaches the hoist, the tail *A* (Fig. 1) of the lever moving on the axis *O* is thrown out so that the lever moves from its original position to that shown by the hatched lines. At the same time, and by the same movement, the arm *B* takes up the position indicated, in which it prevents the succeeding skip from passing into the hoist space. The arm *B* is specially designed to withstand the shocks of the skip rollers. The skip which has run on to the hoist is stopped by a buffer, having come into position by throwing into gear (when passing) the lever *C*, which can fall back again owing to the weight *D*. The point of suspension of the skip is thus fixed with very little play. Then the lift works, the skip is raised and reaches its top position (Fig. 2). There it knocks against a stop which gives the skip its required inclination to run on the mono rail. The skip, which on its upward course has been kept in position by the lever *C*, now throws this over by means of the regulating rod, which acts on the lever by coming in contact with the stop *F* fixed at *E*. This arrangement insures that the automatic release of the skip can only take place when the hoist is in its proper position in line with the fixed rail.

After the skip has started, the hoist automatically descends. At the same time that it reaches its lower position, a finger which it carries, *K* (Fig. 2), which can move only from top to bottom, throws the arresting lever *A* (Fig. 1) back to its original position, and thus allows another skip, if ready, to enter on to the hoist rail. In this way the cycle of movements recommences. It will, of course, be understood that the second hoist at the other end of the purifier house is precisely the same as the one described, and deals with the skips on their return from the top floor to the bottom.

It only remains to add that the French firm of MM. Samain et Cie. have worked out and made the detailed mechanisms of this automatic traveller and hoist, and to say that our details are from the *Journal of Gas Lighting*.

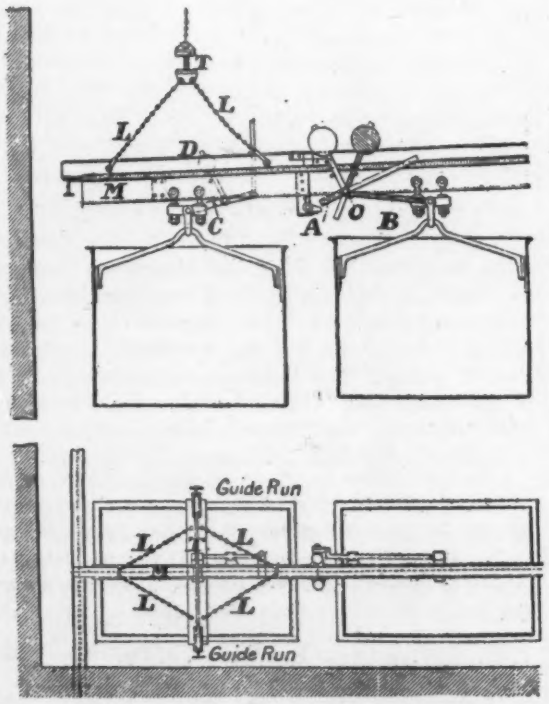


Fig. 1.—Elevation and Plan of Departing Skip.

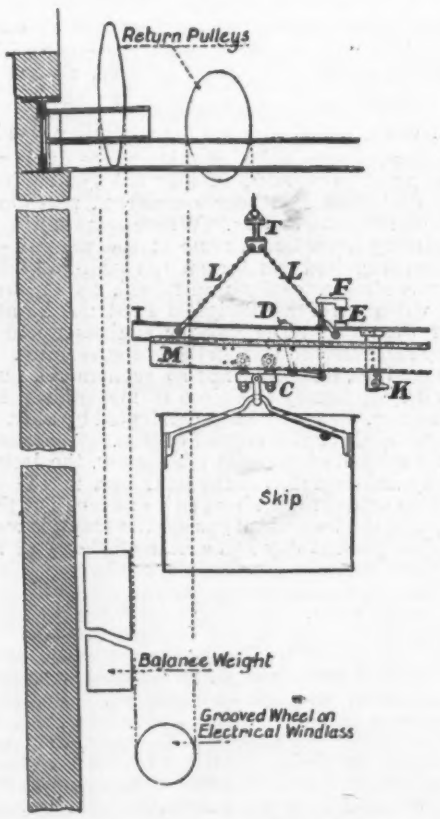


Fig. 2.—Arriving Skip.

The Reliability of Gas Engines.

At a recent meeting of the Coventry (England) Engineering Society the lecturer was Mr. A. Vennell Coster, of Messrs. Crossley Bros., Limited, who commenced his presentation by remarking that the advent of the gas engine as a commercial prime-mover was at the present time affecting in an increasing degree the commerce and trade of the civilized world. As evidence of the strides that have been made, he mentioned that gas engines are now being built of more than 800 B.H.P. units in 2 cylinders, or 1,600 B.H,P. units in 4 cylinders, driven by producer gas. In Germany there were, he said, many firms building large gas engines, up to 4,500 B.H.P. maximum, most of them being for use with blast furnace or coke oven gas. In connection with the question of economy to be obtained by the adoption of large gas engines driven by such gas he gave figures showing that in a German iron and steel works the introduction of gas engines had reduced the cost of fuel by $1.03 per ton of iron during the process of conversion into steel and rolling.

The lecturer went on to say that one of the great tests of reliability of gas engines was the non-stop continuous test. Engines were now regularly supplied which would sustain a non-stop run night and day from early on Monday morning to late on Saturday night. At Messrs. Brunner, Mond & Company's works, at Northwich, he saw one of these engines of about 120 B.H.P. driving a dynamo which never stopped running night and day for upwards of 7 months; and he knew of many large engines running from 1 to 3 months in a similar manner. Personally he was not in favor of such long periods of running. A full week should be ample to meet the demands of almost every kind of manufacture. It was a decided advantage to let the engine have a rest, to have the valves overhauled and the lubricating arrangements and fittings adjusted so as to keep everything in perfect condition. Gas plants, whether of the suction or the pressure type, were designed to undertake the supply of gas for long periods without rest, and to maintain their economy and efficiency under all circumstances. Mr. Coster cited the annual report by Mr. Michael Longridge, the Chief Engineer of the Engine and Boiler Insurance Company, to prove the remarkable advance in reliability that the gas engine has made, inasmuch as in his analysis of breakdowns this engine showed to better advantage than the steam engine. One of its great advantages over the latter engine was the reduction in stand-by losses, which were quite 75 per cent. less than those of the steam engine.

In describing the important development in the use of gas engines which has taken place recently in America for driving high pressure pumps for supplying water at the working pressure of 300 pounds per square inch for extinguishing fires, the lecturer said this spoke well for the reliability of the gas engine, as there was no service that required such absolute certainty as methods for coping with large city fires. The internal combustion engine was also, he said, used largely in connection with lighthouses. Liquid fuel was usually employed for this class of work, and the record for reliability was beyond question. Great improvements had also taken place during the past few years in the design of governors, so that the gas engine could now undertake any duty that had been considered possible only with a first-class high speed steam engine. Where economy in gas consumption was of primary importance, none of the present day elaborate methods of governing had yet beaten the "hit-and-miss" arrangement, which was simple, easily understood, and insured the best economy, and when carefully designed need not be attended with either noise or wear and tear; and for engines up to 250 B.H.P., Messrs. Crossley had retained this method of governing. For vertical multi-cylinder engines, a method not so economical, but one which could govern all cylinders by one piece of mechanism, known as the "throttle" governor, was very largely adopted by most makers, and could be recommended for this type of engine.

Turning to the subject of thermal efficiencies, the lecturer thought it might be safely assumed that of the total heat in the coal the gas engine turned into actual work about twice as much as the best steam engine. Analyzing the losses in a gas engine plant, it was found that the producer of the present day had a heat efficiency of from 80 to 90 per cent., and that the gas engine had an efficiency of from 33 to 35 per cent.; so that of the total heat in the coal about 25 per cent. was converted into actual work. Mr. Coster described the different standard types of producer gas plants, and claimed that with anthracite at $5.25 per ton the cost of fuel per brake horse power was 2 cents per hour. In regard to oil consumption, he said this depended altogether upon the intelligence of the engineer in charge. The two main points to watch were correct and economical distribution, and the running of all oil possible into a filter tank for use again and again. From particulars supplied by Messrs. Cadbury of the oil consumption of their gas engine plant for 12 months, it appeared that, taking the average price of oil at 41 cents per gallon, the cost worked out at 39 cents per B.H.P. per week of 72 hours.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. Robert R. Choate, for something over a year Commercial Manager of the Knoxville (Tenn.) Gas Light Company, has been appointed General Manager of the Massillon (O.) Electric Light and Gas Company.

At the annual meeting of the Laclede Gas Light Company, St. Louis, Mo., the Directors elected were: John I. Beggs, E. M. Bulkley, C. D. Smithers, August Genner, Thos. H. West, James Campbell, Murray Carlton and Chas. H. Huttig.

The authorities of Richmond, Va., are considering the advisability of placing the engineering direction of the municipal gas works in charge of the City Engineer. What greater evidence of incapacity can be advanced than this?

At the annual meeting of the Delaware (O.) Gas Light Company the Directors elected were: V. T. Hills, F. P. Hills, H. W. Jones, J. W. Hills and T. C. Jones. The Directors named the following officers: President, T. C. Jones; Vice-President, John W. Hills; Secretary, John F. Shoub.

The proprietors of the Galesburg (Ills.) Company have about determined to extend their piping system to the outlying settlement of Knoxville, Ills.

A certificate has been filed announcing a change in the title of the Peoples Gas and Electric Light Company, of Canton, Ills., to that of the Canton Gas and Electric Company, and of an increase in its capital stock to $100,000.

"S. E. W." informs us that a decision in the rate case between the authorities of Cedar Rapids, Ia., and the Cedar Rapids Gas Light Company is expected some time next month. Writing of Cedar Rapids recalls to mind the fact that the Cedar Rapids Company has authorized the Gas Machinery Company, of Cleveland, to construct for it a second set of its improved water gas apparatus.

In a notice recently issued by the Parker-Russell Mining and Manufacturing Company, of St. Louis, Mo., the following appears: "The sales and execution of orders and contracts will continue under the direction of our Mr. D. R. Russell. He will be assisted by Mr. George W. Parker and Mr. C. H. Freitsch, who will represent us in the territory formerly covered by Mr. Leigh Wickham, who has resigned from our employ."

At a meeting of the shareholders of the Baron Steuben, N. Y., Gas and Oil Company, the following officers were elected: President, George Nowlen; Vice-President, W. T. Reynolds; Secretary, A. G. Squires; Treasurer, J. H. Smylie.

"The first real glad tidings of Leap Year, as far as the gas business is concerned, go to you from Milwaukee Wis., where 'Saturday fortnight,' 22 young women in the employment of the Milwaukee Company charmingly chaperoned an equal number of young men who figure on its payrolls. The events were a sleigh-ride and a supper. The air was *glace* and the snow was glassy; but these were the only evidences of coolness.—L. B. R."

"P. T. V.," writing under date of the 22d of January, incloses the following: "The Redlands (Cal.) Gas and Electric Company held its annual meeting last week, and the annual reports were certainly of an order well calculated to cause those present to be glad because they were there. The Company has close to 4,200 consumers, and during the year $90,000 was expended in extensions, mainly on the electric system. The increases in gas sendout shown approximated 20 per cent. The officers elected were: President, C. S. Chesnut; Vice-Presidents, C. E. Taylor and Arthur Gregory; Secretary, Delmont Locke; General Manager, F. P. Meserve."

Here is a summary of the new rates which became effective the 1st ult. by the Hillsdale (Mich.) Gas Light Company: For illuminating use, $1.40; for fuel use, $1.15; on both accounts, $1.27, all subject to 15 cents per 1,000 cubic feet. That looks a pretty good schedule.

Major W. Stewart Symington, of Baltimore (Md.), has resigned the position of Assistant Treasurer of the Consolidated Gas, Electric Light Company, of that city. We wish him good luck.

On the 25th ult. the United Gas Improvement Company forwarded check to the City Treasurer, of Philadelphia, in the sum of $201,520.14, on account of royalties on gas sold by it in that city during the quarter ended December 31st, 1907. For the corresponding quarter in 1906 the payment on similar account was $187,145.57.

At the annual meeting of the Hartford City (Conn.) Gas Light Company the following officers were elected; President, E. B. Bennett; Vice-President, George Bullock; Secretary, John A. McArthur; Treasurer and General Manager, R. E. Slade; Superintendent, G. K. Dustin; Directors, E. B. Bennett, Sylvester C. Dunham, James H. Knight, George Roberts, John R. Hills, Francis R. Cooley, S. R. Bertron, George Bullock, John T. Robinson.

Mr. W. C. Belford, Manager of the Hampton and Phœbus Gas Company, Hampton, Va., was found dead in the office thereof the morning of the 23d ult. He was in his 48th year. The circumstances surrounding his finding strongly pointed to suicide; in fact, there is little reason to doubt that he died at his own hands. The worry following the financial difficulties surrounding the Company—it was recently placed in the custody of Messrs. Walter Whetstone and S. J. Dudley as Receivers—are largely responsible for the condition which brought about so deplorable a personal result.

Mr. Frank W. Woolley can now tell anyone who wishes to know just "what time it is," some friends of his on the staff of the Consolidated Gas Company, of Long Branch, N. J., having presented him with a watch. He is a member of the Company's force.

The Vincennes (Ind.) Light and Power Company, through Manager Wyness, has announced that on or about March 1st the Company will have changed its system so as to permit of the distribution to its customers of natural instead of artificial gas. Meanwhile the Company will charge only 30 cents per 1,000 cubic feet for artificial gas until the supply of the natural commodity is actually turned on.

Under the new management great things have been done concerning the business of the Flemington (N. J.) Gas Company. The old oil gas plant has been superseded by a new coal gas plant, which latter was erected on a new L (although adjoining) site in order to permit of the construction of a railway siding. The entire plant was constructed from plans prepared by Mr. F. W. Floyd, of the Quintard Iron Works Company, of New York. A complete 8-inch works was constructed, and the benchwork installed is of the type favored by Messrs. J. H. Gautier & Company, of Jersey City. The officers of the Company are: President, Dr. E. D. Leidy; Secretary, A. H. Rittenhouse; Treasurer, John M. Bullock.

Mr. Albert Sandt, the new Business Manager of the Clinton (Ills.) Gas and Electric Company, seems to have had no difficulty in picking up the threads left somewhat twisted by his predecessor, for he has already added several consumers to the Company's list.

At the annual meeting of the Doylestown (Pa.) Gas Company, the Directors elected were: W. H. Kirk, John Yardsley, E. Schutz, J. P. Stillwell, E. R. Groff, E. W. Kuler, J. F. Hendricks, N. K. Leatherman and F. L. Worthington.

"B. C.," writing from Grand Rapids, Mich., under date of the 24th inst., says: "The annual meeting of the Grand Rapids Gas Light Company was held here this week, and if one may judge from annual reports as telling the story, the officers and stockholders of the Company are to be congratulated on their successful year. The resignation of Mr. Thomas J. O'Brien from the Company's executive branch was very much regretted, for he is one of those men with whom it is a pleasure to be associated in either business or social ways. To be sure, he resigned some time ago, in fact shortly after his appointment to the post of Ambassador to Japan, but its acceptance was delayed until now, in the hope that he could be induced to withdraw it. However, he remained inflexible, and finally his expressed wish was acceded to. The Company as to its works division is in such good physical condition that no work of great moment will be done thereon this summer; but a goodly expenditure will be made on distribution account, chiefly to the charge of extensions—Grand Rapids is surely growing with rapidity. The election for officers resulted as follows: Directors, Lester J. Rindge, Jas. M. Barnett, Henry Idema, Emerson McMillin, J. Boyd Pantlind, W. H. Anderson, H. Sullivan, B. O. Tippy and L. H. Withey—the latter succeeds Mr. O'Brien; President, Emerson McMillin; Vice-President and General Manager, B. O. Tippy; Chairman of the Board, J. B. Pantlind; Treasurer, Mary E. Kearney; Secretary, G. R. Chamberlain. A fixture of the proceedings was a very enjoyable luncheon set in the very best style—and that certainly is good enough for anybody—of 'The Pantlind.'"

Mr. Frank G. Chapman, who had been in the employment of the Great Falls (N. H.) Gas Light Company for several years, died at his home in the adjoining settlement of Somersworth the 20th ult. He was in his 37th year, having been born March 22, 1871. The faithful and efficient nature of his services to the Company will be readily comprehended when it is said that at the time of his death he had attained the position of Superintendent thereto. He was prominent in other directions in his home city, having served as a member of the Somersworth City Council in the years 1901-2. He is survived by his widow and three children. His parents also survive.

Mr. Thomas Maha, General Manager of the Albuquerque (N. M.) Gas Company, was the escort of Prof. Miller, Instructor of Chemistry in the local High School, while the latter and his pupils went through the gas plant the other day. The General Manager was voted a "real expert" on gas matters by the visitors and their leader.

"The annual meeting of the Boise (Idaho) Gas Light Company was held some days ago. The officers elected were: President, A. Ross; Vice-President, Charles Theis; Secretary-Treasurer, W. N. Donaldson; Manager, C. D. Lamson. The shareholders authorized a new issue of bonds in the sum of $200,000, the proceeds to be devoted to the retiring of the old issue, and for expenditure on betterment account. The Company did an excellent business in 1907, and quite a bit of money will be required for main extensions, several outlying districts being clamorous for a gas supply.—A. T. James.'

Mr. F. M. Stark, of Poughkeepsie, N. Y., has been appointed Manager of the Standard Gas Company, of Keyport, N. J., vice Mr. W. A. Richards, resigned.

The annual meeting of the Galveston (Tex.) Gas Company resulted as follows: Directors, John Sealy, R. W. Smith, S. Hutchings, John C. Walden and Henry Runge; President, John Sealy; Vice-President, R. Waverly Smith; Secretary-Treasurer, Charles S. French; Superintendent, John Gimper.

"G. L. W.," writing from Holyoke, Mass., under date of the 29th ult., incloses this mention: "On Saturday the rate charged for electric current for lighting purposes will be 6 cents per kilowatt—the old rate was 10 cents. The department (of course, you know the gas and electric lighting service is operated by the city) last year made a reduction of 25 per cent. in the price of arc lamp service and 20 per cent. in the price of gas. Arc lights are now furnished at $60 per year and gas at $1 per 1,000 cubic feet. These reductions so stimulated the people in the use of gas and electricity that the output of both was largely increased. The official report shows that all running expenses were paid, that much new apparatus was installed, along with 2½ miles of new mains for gas and 11 miles of electric wires; that $29,275.23 was added to the depreciation fund, still leaving a profit of $54,930.99 above all expenses and bad debts. In fact it is known to the writer that the General Manager, Mr. William H. Snow, who was Superintendent of the Company when it was owned by certain mill owners, often said to them, 'Give me the necessary apparatus and I will make this plant the most valuable property you own.' The figures more than prove he was right. During the year there was a gain of 20 per cent. in the volume of gas business and 28 per cent. in electricity furnished. The department now has 869 customers for electricity and 8,152 customers using gas meters. The total receipts were $307,227.64 from electricity and gas and $7,615.98 for coke. There are 45 permanent employees in the gas department and 34 in the electric department, both departments, of course, being managed by Mr. William H. Snow."

Mr. Grange Sard (President of Rathbone, Sard & Co., of Albany, N. Y.) has been elected President of the Trust Companies' Association of the State of New York.

THE AMERICAN GAS LIGHT JOURNAL

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NOTIFICATION RESPECTING ADVERTISING.

Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Company, 39 and 41 Chambers street.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime street, London.

MONDAY, FEBRUARY 3, 1908.

The Market for Gas Securities.

The market for city gas shares was steady during the week; that is, there was little if any recession from the prices of a week ago, at which time they were certainly low enough. Consolidated is 99 to 100 to-day (Friday), with but little trading. Any shareholder who was present at the Company's annual meeting a few days ago, and who is not satisfied that Consolidated gas is worth intrinsically very much more than the quoted figures, should never invest his money in stocks of any kind. Brooklyn Union is dull, but maintains its quotations fairly well for a manufacturing concern that has not paid a dividend in many months.

Out-of-town gas shares hold recent values very well, especially Peoples, of Chicago, which is 85 to 85½. The Company declared its usual quarterly dividend on time. Massachusetts Gas Companies is slowly forging ahead. The inquiry for gas bonds still continues good.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

FEBRUARY 3.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	99	101
Central Union Gas Co.—				
1st 5's, due 1972, J. & J	3,000,000	1,000	92	97
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual	3,500,000	100	—	170
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	85	90
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98	104
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	90	98
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	100	101
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Standard	5,000,000	100	70	100
Preferred	5,000,000	100	100	135
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	90	100
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	299,650	500	120	—
Out-of-Town Companies.				
Bay State	50,000,000	50	½	¾
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	509,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
" " Bonds, 5's	5,250,000	1,000	63	66
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed				
Gold Bonds	7,660,000	1,000	92	92½
Cincinnati Gas and Electric				
Co.	29,500,000	100	94	94¼
Columbus (O.) Gas Co., 1st				
Mortgage Bonds	1,500,000	1,000	92	98
Columbus (O.) Gas Lt. &				
Heating Co.	1,682,750	100	87	88
Preferred	3,036,500	100	81	83
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	90
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Detroit City Gas Co.	6,000,000	50	—	50
" Prior Lien 5's	4,618,000	1,000	—	98
Detroit Gas Co., 5's	381,000	1,000	75	80
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co.,				
Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Lt. Co.,				
1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of				
New Jersey	10,500,000	—	100	105
" Bonds, 5's	10,500,000	—	101	102½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	10	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co.,				
of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	97	97¼
Preferred	2,500,000	100	92¾	93
Bonds	10,000,000	1,000	104	104¼
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip,				
due 1910	100,000	25	60	60½
Massachusetts Gas Compan-				
ies, of Boston	25,000,000	100	84	84¼
Preferred	25,000,000	100	84	84¼
Montreal, Canada	2,000,000	100	218	218¾
Nashville Gas Lt. Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co.,				
Chicago	25,000,000	100	85	85¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Elec. Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco, Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	92	—
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	114
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	96¼	—
Syracuse, N. Y.	1,978,000	100	50	55
Bonds	2,047,000	1,000	102	—
Washington, D. C.	2,800,000	20	340	345
1st Mortgage, 6's	600,000	—	—	—
Western, Milwaukee	4,000,000	—	—	—
Wilmington, Del.	600,000	50	230	—

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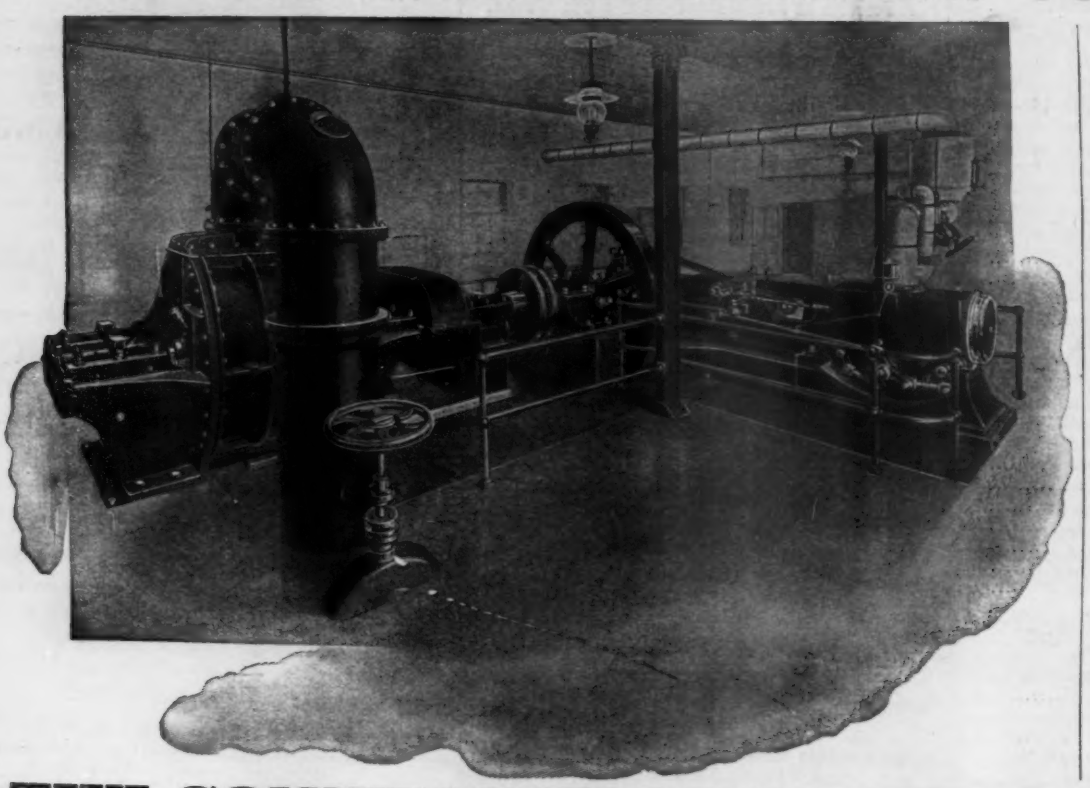

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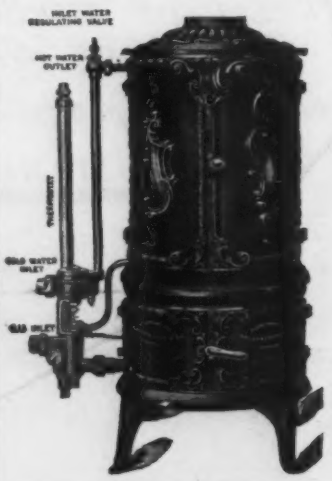

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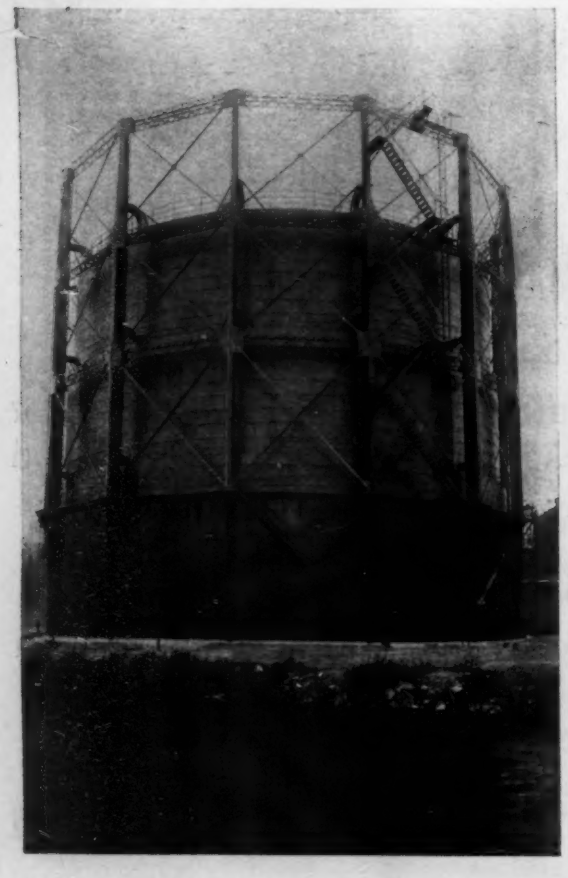

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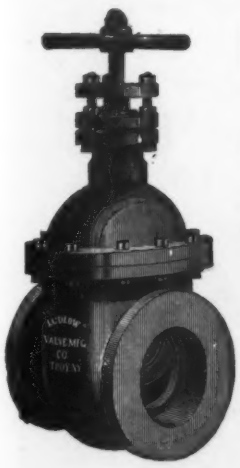

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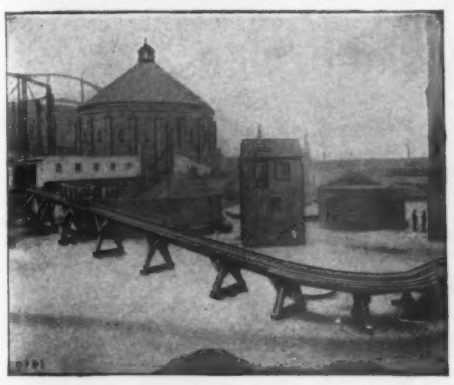

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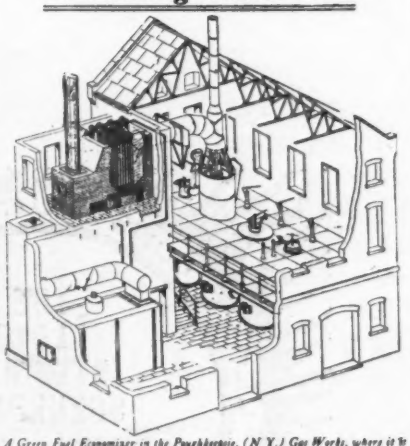

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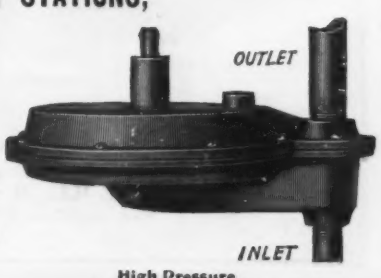

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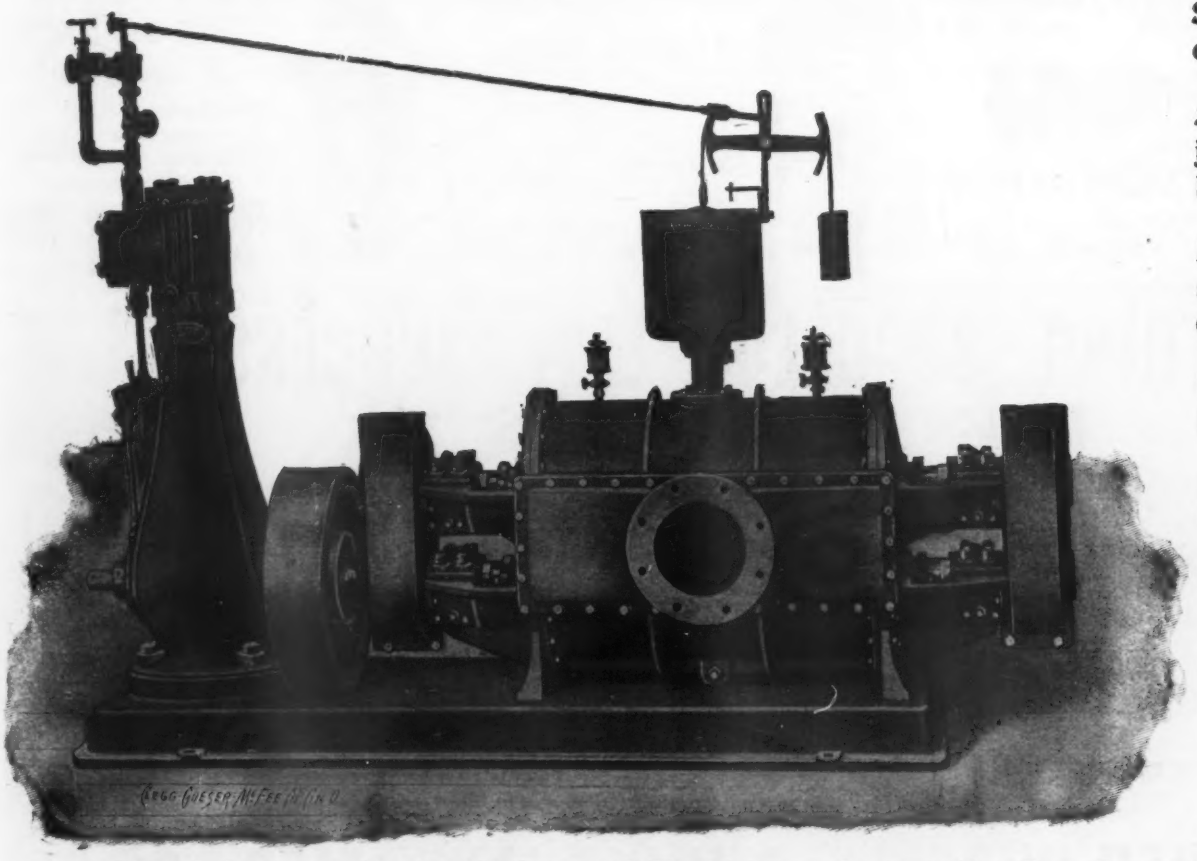

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Photometrical and Experimental Apparatus.

PUBLIC LIGHTING TABLE.

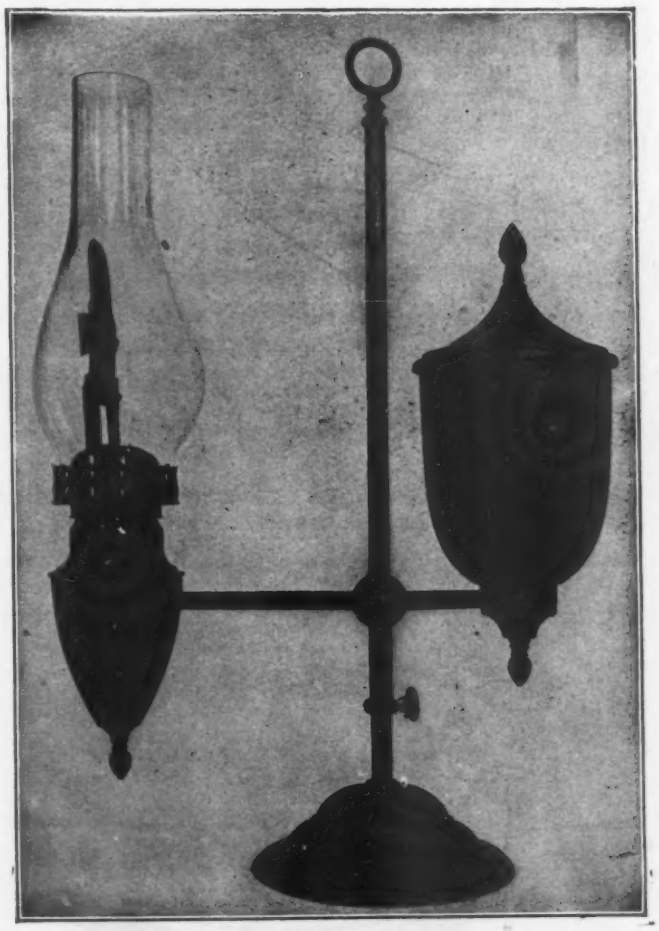
FEBRUARY, 1908.

Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Extinguish.
Sat.	1	5.40 PM	6.10 AM
Sun.	2	5.50	6.10
Mon.	3	5.50	6.10
Tue.	4	5.50	6.10
Wed.	5	5.50	6.10
Thu.	6	9.40	6.10
Fri.	7	10.40	6.10
Sat.	8	11.50 FQ	6.10
Sun.	9	12.50 AM	6.00
Mon.	10	1.50	6.00
Tue.	11	2.50	6.00
Wed.	12	3.40	6.00
Thu.	13	4.30	6.00
Fri.	14	5.10	6.00
Sat.	15	No L.	No L.
Sun.	16	No L. FM	No L.
Mon.	17	No L.	No L.
Tue.	18	6.10 PM	8.00 PM
Wed.	19	6.10	8.50
Thu.	20	6.10	9.50
Fri.	21	6.10	11.00
Sat.	22	6.10	12.00
Sun.	23	6.20	1.00 AM
Mon.	24	6.20 LQ	2.10
Tue.	25	6.20	3.20
Wed.	26	6.20	4.20
Thu.	27	6.20	5.30
Fri.	28	6.20	5.40
Sat.	29	6.20	5.40

TOTAL HOURS DURING 1908.

By Table No. 1.

	Hrs.Min.
January	228.30
February	187.30
March	192.00
April	160.10
May	155.10
June	138.00
July	155.50
August	173.40
September	185.20
October	214.00
November	218.10
December	226.40
Total, yr.	2235.00



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❋❋❋

10-Candle Power.

❋❋❋

This lamp is a perfect substitute for the 10-candle Pentane Lamp hitherto used, and has the following advantages:

1st. It uses Standard Kerosene Oil (Pratt's Astral Oil or equivalent).

2d. It is remarkably steady. Will burn 24 hours continuously with less than 2 per cent. variation.

3d. It is much less dangerous than Pentane, which is a kind of gasolene.

4th. It is not easily affected by air currents in the photometer room.

5th. Since the lamp may burn continuously, the candle power of gas may be taken at any moment, if necessary. This insures steady illuminating power without waste of carburetting material.

6th. The first cost of the lamp brings it within the reach of even small gas works.

7th. Costs much less to maintain than a Pentane lamp or sperm candles doing the same service.

8th. Is not affected by the weather.

PUBLIC LIGHTING TABLE.

FEBRUARY, 1908.

Day of Week.	Date.	Table No. 2. New York City. All Night Lighting. Complete Lighting in One Hour	Complete Extinguishing in 50 Minutes
		From Time Given	
		P. M.	A. M.
Sat.	1	4.47	6.07
Sun.	2	4.47	6.07
Mon.	3	4.47	6.07
Tue.	4	4.47	6.07
Wed.	5	4.57	6.02
Thu.	6	4.57	6.02
Fri.	7	4.57	6.02
Sat.	8	4.57	6.02
Sun.	9	4.57	6.02
Mon.	10	4.57	6.02
Tue.	11	4.57	6.02
Wed.	12	5.07	5.57
Thu.	13	5.07	5.57
Fri.	14	5.07	5.57
Sat.	15	5.07	5.57
Sun.	16	5.07	5.52
Mon.	17	5.07	5.52
Tue.	18	5.07	5.52
Wed.	19	5.17	5.47
Thu.	20	5.17	5.47
Fri.	21	5.17	5.47
Sat.	22	5.17	5.47
Sun.	23	5.17	5.42
Mon.	24	5.17	5.42
Tue.	25	5.17	5.42
Wed.	26	5.22	5.32
Thu.	27	5.22	5.32
Fri.	28	5.22	5.32
Sat.	29	5.22	5.32

TOTAL HOURS DURING 1908.

	Hrs.Min.
January	481.50
February	329.15
March	351.50
April	341.50
May	233.05
June	218.10
July	282.55
August	254.55
September	292.25
October	420.45
November	374.30
December	411.05
	3992.35
Deduct on account of 50 min. extinguish'ng time	30.30
Total, yr.	3962.05

NEW YORK, 318 West 42d Street.
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ST. LOUIS, 712 Roe Building.
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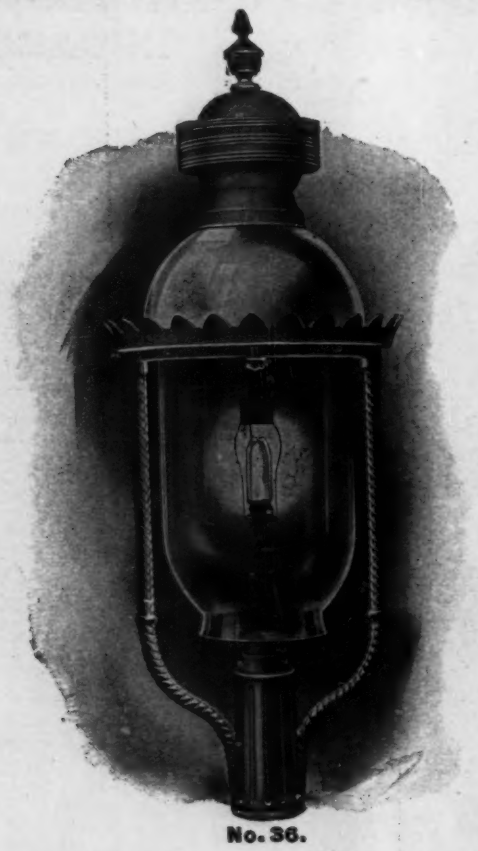
....OF AMERICA....



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Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

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IT LIGHTS THE STREET.

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Everett, Mass.
Jenkintown, Pa. (2d contract).
Coney Island, N. Y.
Mexico, Mo.
Jacksonville, Fla.
Syracuse, N. Y. (2d contract).
Atlanta, Ga. (2d contract).
Holyoke, Mass.
Peoria, Ills.
Schnectady, N. Y. (2d contract).
Danbury, Conn.
Galveston, Tex. (2d contract).
Quebec, Canada.
Indianapolis, Ind. (2d contract).
Bessemer, Ala.
Waterbury, Conn. (5th contract).
Sioux Falls, S. D. (3d contract).
Philadelphia, Pa.
New Hartford, Conn.
Poughkeepsie, N.Y. (2d contract).
Nashville, Tenn.
Salisbury, Md.
Norfold, Va. (4th contract).
Wallingford, Conn.
Richmond, Va. (2d contract).
Oak Bluffs, Mass.

TOTAL SETS INSTALLED TO DECEMBER 31, 1907, ... 677
TOTAL DAILY CAPACITY, TO DECEMBER 31, 1907, ... 545,865,000 cu. ft.

Tar Extractors for Carburetted Water Gas.
Photometrical Apparatus.
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Straight Standpipe System for Coal Gas Retorts.
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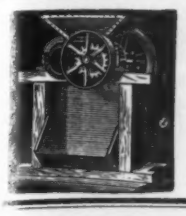

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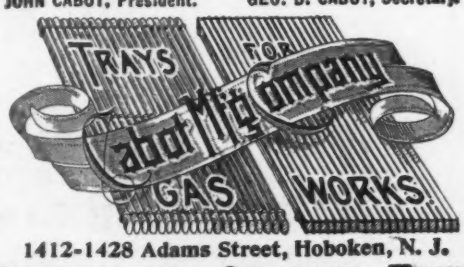

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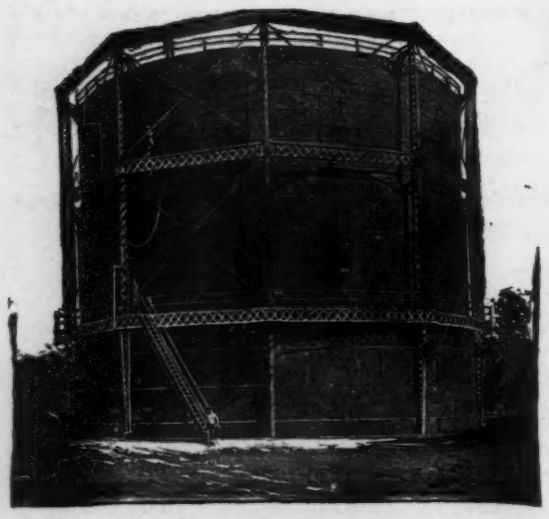

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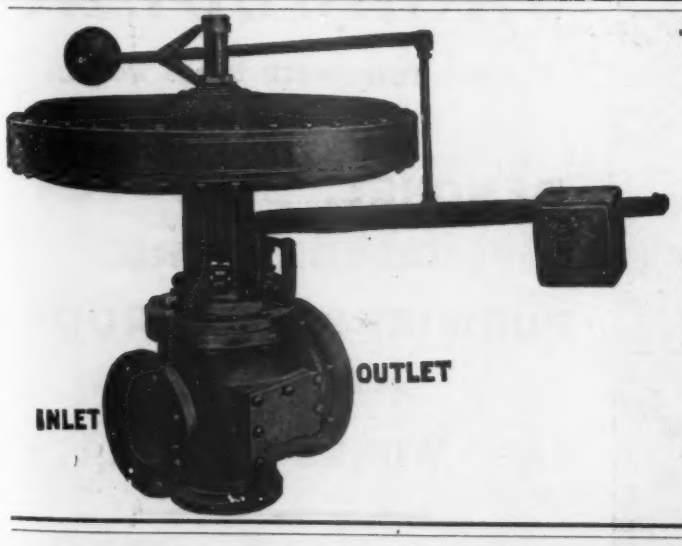

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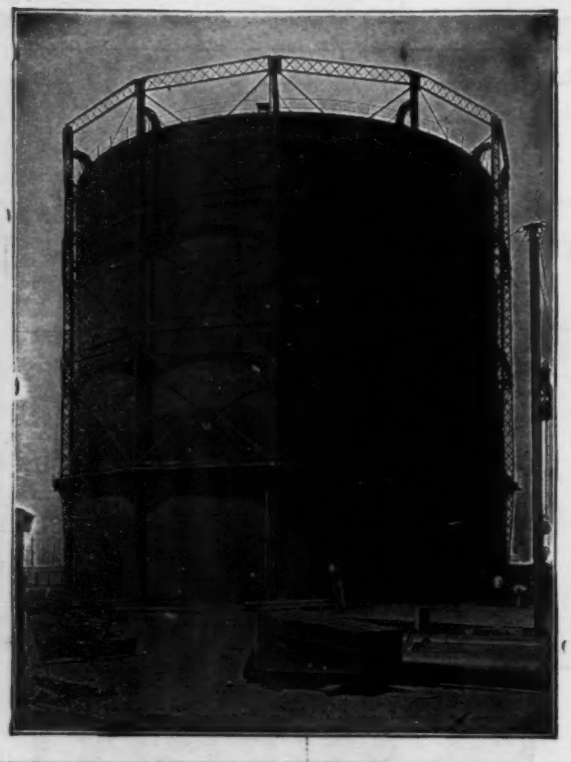

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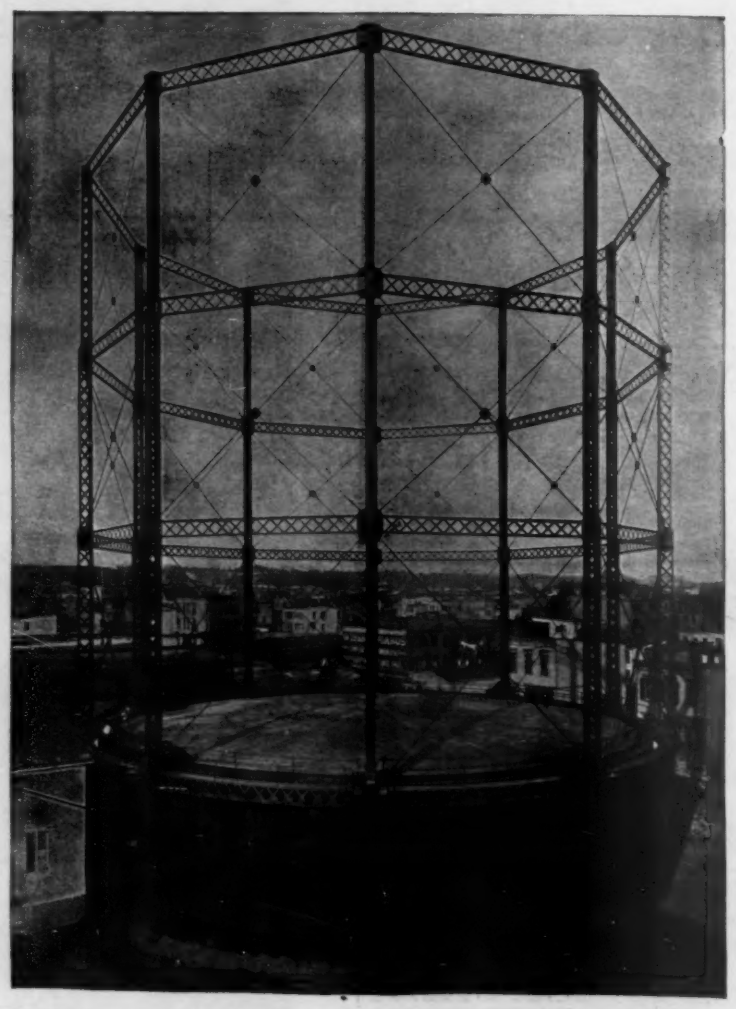

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